REVISED WORKING PLAN

FOR

KURNOOL EAST FOREST DIVISION

FOR THE PERIOD 1940-1950

BY

M. H. KRISHNASWAMY, B.A.

Working Plan Officer

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INTRODUCTION

The revision of the working plan for the old Kurnool East Division, as it was constituted in the year 1937, was undertaken by the author in May 1937. Field work was commenced immediately and was completed by February 1938. The staff was employed on office work from March to June 1938. The working plan draft was completed by July 1938, but as orders on the reconnaissance report were received only in November 1938, the plan for old Kurnool East was submitted only in February 1939 and was sanctioned by the Chief Conservator of Forests tentatively for a period of one year from the 1st of April 1939, pending the question of abolition of one of the Kurnool divisions.

2. Field work in old Kurnool South was commenced in the month of June 1938 and was completed by the end of March 1939. A reconnaissance report for old Kurnool South, although none was required by the Chief Conservator as conditions in that division were similar to the old Kurnool East was however, prepared and was scrutinized by the Working Plans Personal Assistant and orders were passed by him on it in consultation with the Chief Conservator who was camping at Diguvametta at the time.

3. In March 1939, the old Kurnool South Division was abolished and the following changes were effected:—

Yerragondapalam Range was transferred from old Kurnool East to the Guntur Division.

Kanigiri Range, which was in old Kurnool East, was abolished and that portion of the range which was in Nellore district was transferred to the Nellore Division and the balance was added to Giddalur Range of old Kurnool South.

Gundlakamma, Giddalur and Turimella ranges, which were in old Kurnool South, were transferred to the new Kurnool East Division.

Therefore field work in the three new ranges was hurried up and the staff was employed on office work at Kurnool from April to July 1939 when it was completed. The author was on leave for six weeks from the middle of June and the draft of the working plan was submitted in October 1939. The portions of the working plan relating to Yerragondapalam Range and part of old Kanigiri Range, which were transferred to Guntur and Nellore divisions respectively, together with the necessary working plan maps, which were prepared in this office, were forwarded to the Working Plan Officer, Guntur, and the District Forest Officer, Nellore, for necessary action.

4. Therefore, the division has actually completed the preparation of two working plans, viz., one for the old Kurnool East Division and the other for the present Kurnool East during the period May 1937 to June 1939.

21*st February* 1940. M. H. KRISHNASWAMY.

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REVISED WORKING PLAN FOR THE KURNOOL EAST FOREST DIVISION

PART I

Summary of facts on which the proposals are based.

CHAPTER I.—THE TRACT DEALT WITH.

SECTION 1.—NAME AND SITUATION.

1. *Name.*—This working plan deals with the entire Kurnool East Forest Division as it is at present constituted after giving effect to the changes and amalgamations ordered in the proceedings of the Chief Conservator of Forests, Madras, No. 6249/38-C-2, dated 3rd March 1939. The plan is primarily concerned with the administration of the reserved forests of the division under departmental control, but it will also deal with the exploitation of minor forest products from unreserves adjoining reserved forests.

2. *Situation.*—The Kurnool East Forest Division occupies the eastern portions of the revenue district of Kurnool and is bounded on the north by the Nizam's Dominions, on the east by the Guntur Forest Division and Nellore district, on the south by the Cuddapah district and on the west by the Kurnool West Forest Division. The Kistna river forms the boundary between the Nizam's Dominions and this division on the north. The tract dealt with lies between latitudes 15° and 16° 30′ and longitudes 78° 45′ and 79° 30′ east of Greenwich. The division includes part of the Markapur and the whole of Cumbum taluks of the revenue district of Kurnool.

SECTION 2.—CONFIGURATION OF THE GROUND.

3. *Configuration.*—The forests of the division form two distinct continuous massive blocks consisting of a portion of the Nallamalais and the extensions, and part of the Veligondas which lie in the south-eastern portion of the division. The Nallamalais proper consist of a range of unbroken, rugged and fairly steep hills with an average elevation of about 2,000 feet running in a north to south direction over a length of about 70 miles and a width of about 20 miles. The backbone of the Nallamalais forms the boundary between the West and East Kurnool divisions. A series of folds from the main range run in an easterly direction. The hills fall gradually towards the north and north-east into the fairly extensive plateaux of Morricheruvu (1,900 feet) and Guttalachenu (1,400 feet). The Guttalachenu plateau falls abruptly towards the north into the river Kistna to a level of 800 feet, and gradually towards the east into the Yerragondapalam range, now in the Guntur Forest Division. The outer escarpments of the Nallamalais stand out in bold relief overlooking cultivation which is practised in the plains and in the valleys. The highest point on the Nallamalais is Virannakonda, 3,081 feet in elevation; other prominent peaks are Durugappakonda 2,992 feet, Darabailukonda 2,886 feet, Sobanalakonda 2,867 feet, Peddakonda 2,791 feet, Gundlakonda 2,810 feet, Katalakonda 2,847 feet, Eswarakuppa 2,965 feet.

4. *Drainage.*—The general drainage of the Nallamalais is in a north-easterly direction through cultivation into the Gundlakammo river which forms the principal artery of drainage for the eastern portions of the Kurnool district.

5. *The Gundlakamma.*—The Gundlakamma rises to the north-east of Gundlabrahmeswaram in Kurnool West division, flows in a south-easterly direction through tolerably close growth of big trees and bamboo in the Gundlakamma range and rushes down the hills through glens and valleys on the eastern flanks of the Nallamalais and forms the beautiful waterfall of Nemaligundam, situated within the limits of Jalivaripullalacheruvu village of Cumbum taluk. A large gundam or a perennial pool of water about half an acre in extent and of considerable depth lies at the foot of the falls, and above it is situated the famous Rangaswami temple which is visited by many pilgrims throughout the year. The steep hills through which the water falls into the gundam below provide scenery of much beauty. From this point the river flows in an easterly direction, reaching the plains near Jalivaripullalacheruvu. The Gundlakamma is dammed

at Cumbum, forming the ancient and famous Cumbum tank, under which wet cultivation is practised on a large scale. The discharge from the tank again flows into the Gundlakamma which runs from here in a north-easterly direction and is for a second time dammed near Markapur for feeding the beautiful irrigation tank at the place. Thereafter the river continues to flow in a north-easterly direction, a part of its course forming the boundary between the Nellore and Kurnool districts, till it enters the Guntur district, where, an irrigation project is under contemplation. The river is almost perennial and water is found in many parts of the stream bed in pools throughout the year.

6. *The Kistna.*—The river Kistna forms the drainage for a small portion of the northern part of the division. The river itself flows through a steep gorge, over a rugged bed and the approach to the river from the Guttalachenu plateau is difficult except along a few selected paths and valleys.

7. *The Sagileru.*—The drainage of the southernmost part of the Nallamalais is carried by the Sagileru which rises at the south-western corner of the division, runs in a northerly direction, takes a U shape, and flows in an easterly and southerly direction through the plains of Giddalur into the Cuddapah district. The stream is almost perennial.

8. *Other streams.*—Other streams of less importance emerging from the Nallamalais are the Enumaleru, the Rallavagu, the Jampaleru and the Tigaleru. They are seasonal, and have been, in places, suitably dammed to feed irrigation tanks.

9. *The Veligondas.*—The portion of the Veligonda hills falling within this division stand out prominently as two continuous parallel ranges of fairly steep hills running in a north to south direction with a wide valley between them wherein cultivation is widely practised. The highest point on the Veligondas is Jhandakuppa, 2,690 feet in elevation. The water-shed of the eastern range of hills forms the district boundary between Kurnool and Nellore. The drainage from these hills is in a northerly direction into the Gundlakamma.

10. *Passes.*—The Mantralakanama and the Nandikanama are the two passes across the Nallamalais through which road communications exist between the western and eastern parts of the district. The Nandikanama road forms the main artery of communication between the eastern coastal districts and the districts of Kurnool and Bellary. It was opened for vehicular traffic in 1854. It is maintained as a trunk road by the District Board and runs through the southern half of the division into the plains of Nellore. The Mantralakanama road forms the main connecting road between Kurnool and Atmakur on the west, and Dornal, Yerragondapalam and Markapur on the east. The portion of the road which passes through reserved forests is maintained by the Forest department while the rest of it is maintained by the District Board as a second-class road. This road is usually in a bad state of repair, especially the ghat sections. Cart traffic on this ghat road is small except such as is employed on the transport of forest produce and for conveying pilgrims to the Srisailam temple. Another pass of less importance across the Nallamalais is the Velgode pass through which a rough forest road connects Velgode, Adutla, Maddipenta and Papinenipalli. The construction of a road from Papinenipalli to Cumbum has been taken up recently by the District Board and it will offer possibilities of developing the forests of Turimella range.

SECTION 3.—GEOLOGY, ROCK AND SOIL.

11. *Geology.*—Geologically the district affords interesting study. The rocks fall into two distinctly recognizable formations, viz., the Cuddapah and the Kurnool formations of the Archæan age. The Kurnool formation consists of shales, limestones and quartzites, and its distribution is confined to the western portions of the Nallamalais. The Cuddapah formation consists of clay slates (metamorphosed clays and shales) and quartzites, altered sandstones and conglomerates. The rocks in Markapur taluk belong to this formation. Other rocks such as limestones, veins of quartz, etc., are only accessory and are of local occurrence. All the flat country is essentially composed of slates belonging to one or other of the slate groups. On the other hand the hill ranges consist of quartzites (or both shales and quartzites) each individually differing in some marked character.

12. *Rock.*—The rocks have been subjected in ages gone by to many upheavals, contortions and folds, with the result that the lowest beds are often found on the top of later formations, and the beds dip at considerable angles to the surface. Sandstones in mixture with quartzite and occasional shale are the characteristic rock formations on the Veligondas, and at their extreme east, bordering on Nellore, the rocks gradually change into gneissic or granitic composition. Outcrops of barytes and manganese ores occur on the Veligondas, wherein mining licences have been granted for the exploitation of the ores.

13. *Soil.*—The soils may be classified into black, red and mixed varieties each having distinct physical and chemical characteristics. The black soil which is eminently suited to agriculture is confined to localities adjoining Cumbum and the banks of the Gundlakamma. Deep black soil consists for the most part of heavy clay with low permeability, high water-holding capacity, and a high fertility status, but with a fairly high salt and lime content. The red and mixed soils appear to be the products of decomposition and disintegration of rocks of gneissic composition or of sand stones and quartzites supplemented by infiltrations of clay from the shale formations. The red colour is due to ferruginous infiltration from the parent rock. The bulk of the area in Markapur taluk consists of red or mixed soil. These types of soil are loamy, with a high percentage of sand, having low water-holding capacity and high permeability, with the result that rain water rapidly percolates and is readily drained off by the shaly sub-soil. They are of low fertility status and contain a high percentage of lime and salt. Soil is poor and often absent in forest areas except in the valleys where the red or mixed variety occurs. Humus is negligible. The capacity of the soil to retain water is low, and the shale which occurs on hill slopes and in the sub-soil rapidly drains off rain water.

14. *Soil erosions.*—Gulty erosion is occasionally noticeable towards the eastern part of the division. Soil erosion has perceptibly set in, especially in the forests bordering on cultivation, due to overgrazing. Sand drifts occur in the localities of Kakkarala and in the Galjerigulla valley.

SECTION 4.—CLIMATE.

15. *Climate.*—Extreme climatic conditions form a characteristic feature of the division but the timber areas in the interior along the backbone of the Nallamalais and the plateaux of Guttalachenu and Morricheruvu, experience less climatic variations due to their higher elevation and denser vegetation. On the whole, the climate is generally dry and enervating. The months from March to May are the hottest, when the temperature rises to 110°. With the break of the South-west monsoon early in June, the temperature drops by about 10° to 15°. From this time the climate is agreeable and sometimes delightful, till about September, when a short spell of hot weather is experienced before the onset of the North-east monsoon. The cold weather sets in towards the end of November, when the minimum temperature sometimes goes down to as 45°F at night.

16. *Rainfall.*—The western portions of the Nallamalais receive the full effect of the South-west monsoon while the eastern parts receive mostly the North-east monsoon. The average annual rainfall varies from 22·71 inches at Cumbum to 47·41 inches at Maddipenta on the Nallamalais. The average monthly and annual rainfall recorded at various stations in the division are shown in the following statement :—

Statement showing the average rainfall in inches.

Name of the station.	Authority maintaining the station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Remarks.
							Ganjivaripalli Range.								
Nekkanti ..	Forest Department.	0·22	0·30	0·18	0·19	0·76	0·43	3·16	2·41	4·32	4·34	4·44	3·24	23·89	Average for 20 years.
Telugurayanicheruvu.	Do.	0·47	0·36	0·55	0·52	5·50	2·12	2·24	1·99	4·51	4·32	5·87	1·76	30·21	Average for 23 years.
							Dornal Range.								
Rollapenta ..	Do.	0·72	0·70	0·27	0·90	1·04	4·63	9·86	8·10	7·73	4·43	3·65	1·04	43·07	Average for 29 years.
Peddamantrala.	Do.	0·28	0·70	0·30	0·46	0·46	4·15	6·13	5·50	6·24	5·27	3·90	2·57	35·96	Do.
Eguvacherlopalli..	Do.	0·19	0·42	0·18	0·41	0·45	2·78	3·86	0·44	4·13	5·34	4·82	0·54	23·56	Average for years.
							Markapur Range.								
Markapur ..	Revenue Department.	..	0·71	..	0·53	1·21	1·58	2·88	2·85	4·13	5·31	3·74	0·78	23·72	Average for 60 years.
Cumbum ..	Sub-Registrar	..	0·98	..	0·63	1·19	1·83	2·54	2·69	4·14	4·15	3·91	0·65	22·71	Average for 25 years.
							Giddalur Range.								
Giddalur ..	Revenue Department.	..	0·71	..	0·35	1·17	2·37	5·36	4·54	4·54	3·98	2·89	0·44	26·35	Average for 42 years.
Sandrapodu.	Forest Department.	Nil.	0·28	0·08	1·08	0·40	4·32	6·56	7·44	5·86	4·10	3·26	0·04	33·42	Average for 5 years.
							Gundlakamma Range.								
Diguvametta.	Do.	..	0·66	0·44	3·21	1·77	4·52	7·96	5·95	6·58	3·70	2·48	..	37·27	Average for 5 years.
Iskagundam.	Do.	..	0·50	0·52	2·34	0·74	8·62	12·44	5·14	4·24	4·02	2·62	Nil.	41·18	Do.
							Turimella Range.								
Maddipenta.	Do.	0·31	0·58	0·10	0·83	2·22	4·66	9·22	10·78	7·96	6·04	4·30	0·41	47·41	Average for 20 years..
	Average for the district.		**0·52**		**0·55**	**1·32**	**2·75**	**4·15**	**4·47**	**5·87**	**3·99**	**1·60**	**0·27**	**25·49**	Average for 60 years.

The average number of wet days in the district in a year, over a period of 60 years is 41 days.

17. *Unhealthiness of the Nallamalais.*—The Nallamalais are notorious for their unhealthiness, mainly due to malaria of a virulent type. The rainy season and the early cold weather are considered to be the worst periods, while the months from January to June are considered safe for camping on the hills. It is suspected that the Nallamalais are not free from black water fever.

SECTION 5.—WATER-SUPPLY.

18. *General.*—The water-supply is inadequate and the forest and agricultural crops are those characteristic of dry areas. Rainfall is low over a large part of the division, the average being in the neighbourhood of 24 inches per annum. Inhospitable soil conditions aggravated by inadequate rainfall render productivity of field crops low. The Kistna, which flows along the northern boundary of the division is not utilized for irrigation purposes within the district and the river serves only to drain the sub-soil moisture from the tract above it. The course of the river passes through high, steep, rocky banks, and it is seldom resorted to even by cattle except along a few paths. The peculiar nature of the sub-soil formation and the deep beds of the rivers and streams that traverse this division accelerate the rapid drainage of rain water.

19. *Sources of water-supply.*—Numerous tanks, big and small, fed by hill streams, serve as sources of irrigation in the plains but water-supply in them is insecure depending, as it does, on seasonal rains. The more important of these tanks are at Cumbum and Markapur under which wet cultivation is practised to the extent of 5,000 and 750 acres respectively. The Tippayapalam project which has just been completed is expected to bring under irrigation an area of about 1,500 acres. Irrigation tanks within the reserved forests, which are now in disuse, are the Gandicheruvu and Telugurayanicheruvu. A characteristic feature of the division is the raising of irrigated crops under wells sunk in the fields.

20. *Subsoil water.*—The level of the subsoil water is fairly high in the terai portion, but the water is considered unwholesome for drinking purposes as it consists of seepage from close to the surface. Springs in lower strata have to be struck if wholesome and assured supply is to be obtained.

21. *Springs.*—A few surface springs exist within reserved forests which serve as sources of supply to cattle and men. Private people, as a measure of expiation of their sins, have created a few wells and improved some tanks within reserved forests. In summer many of the water-sources dry up and in years of drought, which are not infrequent, much distress is caused to men and animals due to inadequacy of water-supply. Forest stations are poorly served with adequate wholesome water-supply.

SECTION 6.—DISTRIBUTION AND AREA.

22. The division has a total area of 685,915 acres or 1,071·74 square miles of forest under the management of the Forest Department and is one of the largest divisions in the Presidency. The following statement shows the distribution of the area among the six ranges in the division. There are no panchayat forests within the division.

Statement showing the ranges and their area.

Serial number and name of range.	Headquarters.	Area. ACS.	Area. SQ. MILES.
1 Dornal	Dornal	108,661·20	169·78
2 Gundlakamma	Giddalur	81,896·59	127·96
3 Giddalur	Do.	131,576·25	205·59
4 Ganjivaripalli	Ganjivaripalli	164,366·60	256·82
5 Turimella	Turimella	107,817·41	168·47
6 Markapur	Markapur	91,596·80	143·12
	Total	685,914·85	1,071·74

The following is a list of reserved forests under departmental control :—

Taluk.	Name of reserved forest.	Number and date of section 16 notification.	Area in acres.	Class.
	Dornal Range.			
Cumbum	Cumbum (part)	197, dated 1st March 1892	46,208·00	I
Markapur	Markapur (part)	221, dated 5th March 1892	50,139·80	I
	Eastern Nallamalais Block 6 A-1.	1263, dated 9th December 1903.	1,606·40	I
	Do. 6 A-2.	Do.	1,849·60	I
	Do. 6 B.	Do.	2,316·80	I
	Do. 6 C.	Do.	3,161·60	I
	Do. 7	431, dated 30th April 1903	3,379·00	I
		Total	108,661·20 or 169·78 sq. miles.	
	Gundlakamma Range.			
Cumbum	Cumbum (part)	197, dated 1st March 1892	68,540·99	I
	Uyyalavada (part)	287, dated 10th April 1891	13,135·60	I
	Eastern Nallamalais Block 1 (part).	*Fort St. George Gazette*, No. 43, dated 24th January 1900.	220·00	I
		Total	81,896·59 or 127·96 sq. miles.	

Taluk.	Name of reserved forest.	Number and date of section 16 notification.	Area in acres.	Class.
		Giddalur Range.		
Cumbum ..	Veligondas North	943, dated 20th November 1890.	15,510·97	I
	Do. Extension I ..	634, dated 22nd June 1903 ..	11,843·00	I
	Do. Extension II ..	3772, dated 17th December 1912.	3·82	I
	Veligondas South Block 1 ..	772, dated 25th September 1890.	12,902·98	I
	Do. 2 ..	Do.	472·23	I
	Veligondas South Extension I.	1035, dated 8th October 1903.	4,692·00	I
	Do. II.	848, dated 9th April 1915 ..	64·68	I
	Veligondas West	76, dated 22nd January 1892.	18,166·97	I
	Giddalur Block 1*	1245, dated 20th December 1900.	3,342·00	I
	Do. 2*	Do.	7,374·00	I
	Mundlapad	691, dated 3rd December 1896.	966·40	I
	Maduva	385, dated 11th July 1898 ..	1,424·00	I
	Uyyalavada (part)	287, dated 10th April 1891 ..	40,726·80	I
	Do. Extension ..	1053, dated 15th December 1897.	14,086·40	I
		Total ..	131,576·25 or 205·59 sq.miles.	
		Ganjivaripalli Range.		
Markapur ..	Markapur (part)	221, dated 5th March 1892 ..	159,564·80	I
	Eastern Nallamalais Block 8 ..	642, dated 21st July 1902 ..	2,182·40	I
	Do. 9 ..	1179, dated 21st November 1903.	2,619·40	I
		Total ..	164,366·60 or 256·82 sq.miles.	
		Turimella Range.		
Cumbum ..	Cumbum (part)	197, dated 1st March 1892 ..	46,929·00	I
	Ambavaram	665, dated 2nd August 1897 ..	10,332·61	I
	Somidevipalli	601, dated 20th July 1897 ..	9,275·90	I
	Eastern Nallamalais Block 1 (part).	*Fort St. George Gazette*, No. 43, dated 24th January 1900.	12,373·20	I
	Eastern Nallamalais Block 2 (part).	863, dated 23rd December 1899.	14,917·10	I
	Eastern Nallamalais Block 3 (part).	1105, dated 1st November 1900.	13,989·60	I
		Total ..	107,817·41 or 168·47 sq.miles.	
		Markapur Range.		
Cumbum ..	Cumbum (part)	197, dated 1st March 1892 ..	39,872·00	I
	Eastern Nallamalais Block 2 (part).	863, dated 23rd December 1899.	3,840·00	I
	Eastern Nallamalais Block 3 (part).	1105, dated 1st November 1900.	11,571·60	I
Cumbum and Markapur.	Eastern Nallamalais Block 4.	658, dated 1st August 1901 ..	27,993·60	I
Markapur ..	Eastern Nallamalais Block 5.	1186, dated 26th December 1901.	8,319·60	I
		Total ..	91,596·80 or 143·12 sq.miles.	
		Grand total ..	685,914·85 or 1,071·74 sq. miles.	

List of enclosures.

Name of reserved forest.	Name of enclosure.	Area in acres.
	Dornal Range.	
Markapur	Devaluti	20·08
Markapur and Eastern Nallamalai Block VI-A 1.	Eguvacherlopalle	143·30
Eastern Nallamalai Block VI-C	Potharaju	8·30
	Kurapenta	111·40
	Giddalur Range.	
Maduva	Allinagaram	24·11
West Veligonda	Kondukunta	155·00
	Ganjivaripalli Range.	
Eastern Nallamalai Block IX	Chennupalli	165·50
	Venkatadripalem	195·20

* Giddalur Blocks 1 and 2 were handed over to Panchayat on 12th September and 15th June 1927, respectively under G.O. No. 1244, dated 18th February 1927, but were transferred back on 12th March 1935 to Forest department in G.O. Ms. No. 94, Development, dated 19th January 1935.

Name of reserved forest.	Name of enclosure.	Area in acres.
	Turimella Range.	
Eastern Nallamalai Block I	Pullalacheruvu	21·87
	Krishnamchettipalli	12·67
Eastern Nallamalai Block II	Bogol	6·24
	Yerraguntla	881·00
Eastern Nallamalai Block III	Bollupalli	99·87
	Papinenipalli	24·23
Ambavaram	Payalapalli	105·48
	Racherla	54·54
	Pullalacheruvu	47·01
	Markapur Range.	
Eastern Nallamalai Block IV	Katamraju	23·54
	Regatikunta	60·63
Eastern Nallamalai Block V	Iyunnumukkala	49·66

SECTION 7.—STATE OF THE BOUNDARIES.

23. *Reserved forest boundaries.*—The reserve boundaries, when they do not follow natural features, are defined by lines cleared to a width of 18 feet with rough stone cairns constructed at salient points. The maintenance of reserve boundaries is one of the duties of the local beat staff and the cairns are whitewashed annually at departmental cost. The state of the boundaries is generally satisfactory, but in some instances neither do the cairns conform to the required dimensions nor do reserve boards exist as is required under the Forest Manual.

SECTION 8.—LEGAL POSITION.

24. *Legal position.*—The reserved forests of the division are the absolute property of the State subject to the exercise of certain rights and concessions admitted at the time of settlement. Particulars regarding the numbers of section 16 notification in respect of each reserved forest have been given in the statement under section 4.

SECTION 9.—RIGHTS AND CONCESSIONS.

25. *General public.*—The rights and concessions admitted in favour of the general public are given in a brief form in the following statement. The section 16 notification relating to each reserve contains complete details of the rights and concessions admitted at the time of settlement. The rights consist of rights of way, rights to watering places, rights to worship at temples and shrines and rights to camping places. The existing rights and concessions are not likely to affect the management of the forests.

List of rights and concessions admitted at settlement in favour of the general public.

Reserve. (1)	Right to worship at the following shrines. (2)	Right of way. (3)	Right to watering places. (4)	Right to camping grounds. (5)
1 Cumbum ..	1 Mallalamma shrine at Bandala-chelika. 2 Ligamayya shrine at Lingamayya karuva. 3 Nemaligun-dam Ranga-swami temple. 4 Lakshamma shrine. 5 Visegadda Viranna shrine. 6 Bayyanna shrine. 7 Mantralamma on the Mantralaka-nama road. 8 Chinnaman-tralamma shrine.	1 Footpath from Pullala-cheruvu to Mahanadi via Kolta kanama. 2 Footpath from Pullala-cheruvu to Gundlabrah-meswaram. 3 Bridle path called Chukkala-ghattu path from Chinna-gamipalli to Gundlabrah-meswaram. 4 Velgode kanama path from Bolupalle to Velgode. 5 Nuthikuruva path from Bommilingam to Chilaka-cherla. 6 Korthikanama path from Cherlopalle to Pedda Anantapuram. 7 Footpath from Kurapenta to Nallagunta. 8 Bandy track from Irukudu-palle to Chinnamantra-lamma. 9 Narayanapuram kanama path, foot and cattle-path from Akavidu to Gundla-brahmeswaram. 10 Bandy track from Nalla-guntla to Kurapenta.	1 The Medari-sela. 2 Mantralakama tank.	1 Jangambhavi, 3 acres. 2 Mantralamma, 3 acres. 3 Chukkala-gattu, 25 yards square. 4 Bandalache-lika, 25 yards square. 5 Peddiveni-penta, 25 yards square. 6 Pogapade, 200 × 90 yards. 7 Adutla, 200 × 100 yards. 8 Lingamayya-peta, 200 × 100 yards. 9 Chinnamantra-lamma, 2 acres. 10 Bijinepalle kunta, 50 yards square. 11 Yenigada-mudu, 50 yards square.

Reserve. (1)	Right to worship at the following shrines. (2)	Right of way. (3)	Right to watering places. (4)	Right to camping grounds. (5)
2 Markapur ..	....	1 Bommalapuram to Srisailam path; for men, cattle and carts up to Chintala and thereafter for men and cattle only. 2 Foot and cattle-path from Cherlopalli to Chintala. 3 Foot and cattle-path from Venkatadripalem to the temple at Palanka. 4 Footpath and cattle-path from Dornal to Chintala. 5 Venkatadripalem to Srisailam; the pathway being available for men, cattle and wheeled traffic up to Yathambhavi and thereafter for men and cattle only.	....	1 Devaludu, 220 × 30 yards. 2 Marripalem, 100 yards square. 3 Wantimarri, 50 yards square. 4 Chintala, 50 yards square. 5 Bank of Nippulagundam, 30 yards square. 6 Battulutichelima, 30 yards square. 7 Jangamiddala, 50 yards square. 8 Yatambhavi, 50 yards square. 9 Telugurayanicheruvu in two places, 30 yards square and 50 yards square. 10 Gandicheruvu, 50 yards square. 11 Madamchelima, 30 yards square.
3 Somidevipalle.	1 Bairavaswami shrine. 2 The shrine of Bairavudu.	1 Footpath from Lingapuram to Chinna Cumbum. 2 The footpath and cattle-path from Lingapuram to Chinna Cumbum from the famine road. 3 The famine road from Lingapuram to Kistnapuram.	1 Near the shrine of Byravudu for purposes of worship only.	....
4 Ambavaram.	1 The shrine of Gurrapaderada. 2 The shrine of Linganna.	1 Cart-track from Giddalur to Payalapalle. 2 Footpath from Payalapalle to Racherla. 3 Cart-track from Pullalacheruvu to Ambavaram. 4 Footpath from Yellapalle to Racherla. *Note.*—Access only to the ryots of Payalapalle.	....	....
5 Eastern Nallamalai Block I.	....	1 Cart-track from Pullalacheruvu to Rangaswami temple. 2 Footpath from Pullalacheruvu to Rangaswami temple. 3 Footpath from Pullalacheruvu to Enclosure No. 1. 4 The footpath from Pullalacheruvu to Mahanadi. 5 The footpath from Pullalacheruvu to Enclosure No. 2. 6 Cart-track from Ambavaram to Pullalacheruvu. 7 Footpath from Ambavaram to Enclosure No. 3. 8 Footpath from Krishnamsettipalle to Enclosure No. 4. 9 Cart-track from Uppalapad to Diguvametta railway station.	....	....
6 Eastern Nallamalai Block II.	1 The shrine of Bairavaswami on Bania konda.	1 Footpath from Akavidu to Papinenipalle. 2 Cart-track from Papinenipalle to Yerraguntla Agraharam. 3 Footpath from Domakunda to the temple of Bairavaswami. 4 Footpath from the temple of Bairavaswami to Sannasivani cave. 5 Footpath from Mohideenpuram to the temple of Bairavaswami. 6 Footpath from Mohideenpuram to Turimella. 7 Footpath from Turimella to Akavidu.	....	....
7 Eastern Nallamalai Block III.	1 The shrine of Tirumalanathaswami. 2 Another shrine of Tirumalanathaswami on Turimella-Devarakonda path.	1 Footpath from Velagalapaya to Bollupalle. 2 Footpath from Rangapuram to Bollupalle. 3 Footpath from Rangapuram to Aradavid. 4 Footpath from Chinnayachavaram to Ardavid. 5 Footpath from Chinnayachavaram to Donakonda. 6 Footpath from Bommalingam to Cumbum. 7 Footpath from Basereddipalle to Maddulamadaka. 8 Footpath from Magatur to Pedda Kandukur. 9 Footpath from Kakerla to Pedda Kandukur. 10 Cart-track from Bollapalle to Veligode.	....	....

Reserve. (1)	Right to worship at the following shrines. (2)	Right of way. (3)	Right to watering places. (4)	Right to camping grounds. (5)
8 Eastern Nallamalai Block.	....	1 Footpath from Dornal and Bommalapuram to Magatur via Katamrajalu. 2 Cart-track from Gundamcherla to Magatur. 3 Footpath from Gundamcherla to Magatur. 4 Footpath from Gundamcherla to Kolabhiminipadu. 5 Footpath from Gottipadya to Gundamcherla. 6 Footpath from Gottipadya to Magatur.	....	....
9 Eastern Nallamalai Block V.	....	1 Cart-track from Kadaparajupalle to Cherlopalle. 2 Footpath from Iynamukkala to watering place called Medarisela. 3 Footpath from Iynamukkala to the shrine to Bayyanna. 4 Footpath and cattle-path from Chinna Dornal to Bayyanna. 5 Footpath from Chinna Dornal to Chintalamuduppi. 6 Footpath from Katkamipalli to the shrine of Viragedda Viranna. 7 Footpath from Kalkanipalli to Kalanutla. 8 Footpath from Ramachandrakota to Kalanutla. 9 Footpath from Ramachandrakota to Sunkesula. 10 Footpath from Badvid to Sunkesula. 11 Footpath from Kalanutla to Badvid. 12 Footpath from Kalanutla to the shrine of Viragedda Viranna.	....	....
10 Eastern Nallamalai Block VI A-1.	....	1 Mantralamma cart-track .. 2 Footpath and cattle-path from Eguvacherlopalli to Chintala.	....	....
11 Eastern Nallamalai Block VI A-2.	....	1 Footpath and cattle-path from kandoms 11 and 12 of Edavalli to Eguvacherlopalli.	....	....
12 Eastern Nallamalai Block VI C.	Shrine of Poturazu.	1 Cart-track from Eguvacherlopalli to Chinnamantrala. 2 Footpath and cattle-path from Kurapenta to Velagalapaya.	....	....
13 Eastern Nallamalai Block VII.	....	1 Footpath and cattle-path from Pedda Bommalapuram to Dornal. 2 Footpath from Dornal and Iyanamukkala to Chintala.	....	....
14 Eastern Nallamalai Block IX.	....	1 Footpath and cattle-path from Venkatadripalam to the temple at Palanka. 2 Cart-track from Gangamvaripalli to Srisailam.	....	....
15 Uyyalvada.	1 Cave of Antaragangamma. 2 Cave of Bodiswarudu. 3 Shrine of Chikkumaddi Narasimhaswami. 4 Temple of Byravaswami. 5 Temples of Tirumalanadhaswami and Iswarudu.	1 Patlacherava footpath .. 2 Bodhicherava path. 3 Chikumadicherava path. 4 Papuletichorava path. 5 Path from Venkatapuram to Ahobilam. 6 Footpath from Obunenipodu to Rudravaram.	1 Antarangamma Stream. 2 Pattagandams pools. 3 Bodi stream. 4 Chukumadicherava vagu. 5 Tadutla. 6 Stream near the Papuledu temple. 7 Domaledu. 8 Medaravanichelima.	....

Reserve. (1)	Right to worship at the following shrines. (2)	Right of way. (3)	Right to watering places. (4)	Right to camping grounds. (5)
16 Uyyalvada Addition.	Nil.	1 Cart-track from Kanchipalli to Tirumalanathaswami temple. 2 Cart-track from Mundlapad to Tirumalanathaswami temple. 3 Cart-track from Mundlapad to Papulavedu Byravaswami and Ahobilams. 4 Cart-track from Kothakota to Byravaswami temple. 5 Cart-track from Gadikota to Ahobilam via Narasimhaswami temple. 6 Cart-track from Gadikota to Ahobilam. 7 Cart-track from Uyyalvada to Bodiswaragudi. 8 Cart-track from Uyyalvada to Ahobilam. 9 Cart-track from Uyyalvada to Antaragangamma cave.	....	....
17 Mundlapad..	....	1 Cart-track from Mundlapad to Tirumalanathaswami temple. 2 Cart-track from Mundlapad to Papulavedu Byravaswami temple.	....	....
18 North Veligonda.	1 Cave of Konda Obayya.	1 Akkapallitoka path. 2 Chennupalli to Pagalla path. 3 Janakanama path. 4 Nandikanama path. 5 Chilakalanerupu path. 6 Nakkatoka path. 7 Kanamaselatoka path. 8 Singasamipalli to Pogulla path.	....	....
19 North Veligonda Extension 1.	....	1 Foot and cattle-path from Selakalavidu to Nellore district. 2 Foot and cattle-path from Salakalavidu to Janakanama. 3 Foot and cattle-path from Salakalavidu to Neredikanama. 4 Foot and cattle-path from Salakalavidu to Chilakalamerupu. 5 Foot and cattle-path from Salakalavidu to Akkapallithoka. 6 Foot and cattle-path from Salakalavidu to Kanamaselatoka. 7 Foot and cattle-path from Galjerigulla to cave Konda Obayya. 8 Foot and cattle-path from Singasamipalli to Pagalla. 9 Janapala cheruvu cart-track.	....	....
20 Veligonda South Blocks I and II.	....	1 Foot and cattle-path from Barlakunta-Chintalapalli famine road to Konapalli. 2 Foot and cattle-path from Chintalapalli to Tekulapenta. 3 Foot and cattle-path from Erraguntla to Mylacherla. 4 Foot and cattle-path from Tekulapenta to Maduva. 5 Foot and cattle-path from Kinnerlabhavi and well to Maduva. 6 Bandy track from Maduva to Allinagaram.	1 Well in Gadisela. 2 Nallasela. 3 Gunabotikunta.	....
21 South Veligonda Extension 1.	....	1 Foot and cattle-path from Tekulapenta to Chintalapalli. 2 Foot and cattle-path from Tekulapenta to Tatireddipalli. 3 Cart-track from Maduva to Allinagaram. 4 Foot and cattle-path from Mylacherla to Erraguntla.	....	..

Reserve. (1)	Right to worship at the following shrines. (2)	Right of way. (3)	Right to watering places. (4)	Right to camping grounds. (5)
22 Maduva ..	Temple of Ramalinga-swami.	1 Foot and cattle-path from Tekulapenta to Maduva hamlet. 2 Foot and cattle-paths from Kinnerlabhavi to the Maduva well. 3 Foot and cattle-paths from Nellore district to Maduva. 4 Cart-track from Allinagaram to Maduva.	Maduva well.	
23 Veligonda, West.	1 Shrine of Ankalamma also called Koppu Ankalamma. 2 Shrine of Ankalamma also called Utla Ankalamma. 3 Shrine of Bollikonda-rayudu. 4 Shrine of Bhyravudu.	1 Cart-track from Pandilla-palli to Konduk nta. 2 Path to Khajipuram. 3 Path to Madanapalle cheruvu. 4 Foot and cattle-path from Thaticherla. 5 Pattipalli-Barlakunta foot-path. 6 Thaticherla foot-path. 7 Poluvanipalli foot-path. 8 Chintalapalli foot-path. 9 Cart-track from Bhyravani-sela to the shrine of Bhyravudu.	1 Puladona. 2 Munayya-bhavi. 3 Bhyravadu-gundam.	

Note.—Bandy tracks are available for men, cattle and wheeled traffic; foot and cattle paths and bridle paths for men and cattle, foot-paths for men only.

The right provides for the use of water *en route*, tethering animals, cooking, etc.

26. *Chenchus.*—Special mention should be made of the liberal concessions and rights admitted in favour of the Chenchus at the time of Forest Settlement as they have a bearing on the management of the forests. In addition to rights of occupancy and to cultivate lands, the Chenchus are allowed to graze their cattle and goats free of charge subject to a maximum fixed for each gudem. A list of such rights and concessions is given in the following statement. In addition to these, the Chenchus enjoy rights of way, rights to watering places and to worship at shrines, rights to collect specified minor forest products, and use them for *bona fide* domestic consumption, rights to shoot and fish, within the gudem limits which have been described in the Section 16 Notification.

Reserve in which the gudem is situated. (1)	Name of the gudem. (2)	Dwelling sites of the gudem. (3)	Rights admitted. Dwelling. (4)	Cultivation. (5)	Free grazing. Cattle. (6)	Goats and sheep. (7)
				ACS.	NO.	NO.
Markapur ..	Thummalabailu ..	Thummalabailu ..	100 × 50 square yards.	2·00	..	..
	Alutla	Nekkanti .. .. Palutla	200 × 200 square yards.	5·00	250	250
	Pannalabailu ..	Guttalacheruvu ..	100 × 50 square yards.	5·00	150	150
		Bandiraynicheruvu ..	Do.	5·00		
	Suddakunta ..	Suddakunta .. .. Gandicheruvu (in Yerragondapalem Range).	2 acres .. Do. ..	..	10	100
	Medamchelima ..	Medamchelima ..	Do. ..	..	40	200
		Mallareddigudem ..	Do. ..	..	..	..
		Allipalem	Do. ..	..	..	..
	Daddanala	Daddanala	Do. ..	..	10	50
	Endalvanmayani-cheruvu.	Telugurayani-cheruvu.	Do. ..		50	100
	Marripalem ..	Marripalem	Do. ..	..	..	50
	Peddachama ..	Peddachama	Do. ..	..	..	50
	Chintala	Chinnachama.. .. Chintala	1 acre ..	..	20	50
Cumbum ..	Pogapadu	Maddi	50 × 50 square yards.	..	..	..
	Kurapenta	Chinnamantralamma.	2 acres ..	..	..	50
		Kurapenta in Eastern Nallamalai Block 6-C.	This dwelling site is included in a big enclosure which is a patta land.	..	..	..
	Irukudupalli ..	Mantralamma ..	2 acres ..	..	..	100
	Chilakacherla ..	Nuthibhavi	3 ,, ..	..	60	300
	Akavidu	Bijinepallikunta	50 × 50 square yards.	..	..	..
		Yengadamudu ..	Do.	..	..	..
	Panukumadugu ..	Thummagundanpenta.	1 acre ..	..	10	100
	Outside reserve ..	Ganupalli	..	..	..	25
		Nallagunta ..	..	..	..	100
		Bommilingam ..	..	..	..	..

CHAPTER II.—THE FOREST.

SECTION 1.—COMPOSITION AND CONDITION OF THE CROP.

27. *Origin.*—The bulk of the forests of this division consists of secondary origin composed of mixed deciduous species of low density and poor girth and height. There is little doubt that in the past the forest tract was more densely populated than it is now, sickness, war and famine being chiefly responsible for the depopulation. Abandoned cultivation, ruins of fortifications, distinct avenues of tamarind and banyan trees, old pagodas, some of them deserted and in ruins, and numerous tanks in ruin some of which served as irrigation sources in the past, all these factors bear testimony to the fact that the country was at one time more populous and prosperous, and that consequent on depopulation followed by relinquishment of cultivated holdings, it has lapsed into jungle.

28. *Factors governing types.*—The factors affecting the general distribution of vegetational types are—

(1) altitude,
(2) moisture,
(3) soil, and
(4) external damage.

29. *Altitude and rainfall.*—Variations in altitude with its concomitant changes of rainfall are largely responsible for the determination of vegetational type. Increase of altitude is invariably associated with greater rainfall and a correspondingly higher type of ecological formation. The foot hill and plains portions which receive a low rainfall are generally associated with thorny scrub or an inferior deciduous type of little commercial importance, while the plateau portions which receive slightly greater rainfall and are higher in altitude support forests of an open deciduous type the predominant species being *Hardwickia binata* (yepi). In this type the grass flora consists of desirable strains of good fodder value for cattle and the grass occurs in dense masses. The backbone of the Nallamalais, with its spurs, receives an annual rainfall of about 40 inches and more, and the elevation is in the neighbourhood of 2,000 feet. Conditions here approach the monsoon forest type and superior deciduous species such as *Terminalia tomentosa, Tectona grandis* (teak), *Pterocarpus marsupium* (yegi), etc., are well represented though the quality of the tree growth is generally poor, except in very favourable localities. Bamboos, both *Dendrocalamus* and *Bambusa*, occur profusely in dense stands. The ground flora consists of tall grass mixed with shrubs and weeds. Broadly speaking the vegetational type falls gradually from superior deciduous and bamboo on the west to *Hardwickia* and inferior deciduous type on the north, north-east and east, into inferior deciduous and thorny scrub towards the east.

30. *Soil.*—Another factor which has a bearing on the distribution of forest types is soil. Forests of a superior deciduous type are generally associated with deep soil formed by the decomposition and disintegration of gneissic rocks. Soil resting on shale or schist formations generally supports inferior deciduous or *Hardwickia binata* type, while calcareous formations with an admixture of quartzite support thorny scrub type with some *Acacias* and *Dichrostachys*. Red sanders occurs on sandstone formations and quartzites.

31. *External damage.*—The incidence of fire, theft and grazing, and the proximity of the forests to private holdings are among the most important external factors affecting the composition and condition of the forest. Annual fires in the superior deciduous type are destructive of natural regeneration and cause unsoundness in trees, besides impoverishing the soil; whereas on the plateau periodical fires appear to result in enhancing the value of the pasture and in promoting the regeneration of *Hardwickia binata* (yepi). Overgrazing and illicit felling and lopping of *Hardwickia binata* (yepi) trees for cattle fodder have been responsible for the ruin of the grazing grounds bordering on village lands.

32. *Classification.*—The forests of the division may be broadly classified into the following regional types :—

(1) The sub-montane forests,
(2) the forests on the slopes overlocking cultivation,
(3) the plateau forests, and
(4) the hill forests.

33. *Sub-montane forests.*—The sub-montane forests occupy a long strip of land of varying width at the foot of the hills bordering on cultivation. They consist for the most part of nearly flat or gently undulating country interspersed with streams. The soil consists of sandy loam with an admixture of small boulders, and parts of this type are suitable for cultivation of field crops. These forests are overgrazed by village cattle and have been the scene of depredation by man for small timber, fuel, thorn and fodder leaves. The resultant tree growth consists of dwarfed specimens of thorny shrubs of characteristically dome-shaped formation, with little tree growth of any commercial importance. *Hardwickia binata* occurs in favourable situations, either as a pure crop or in mixture with inferior deciduous species.

34. *Outer slopes.*—The outer slopes of the Nallamalais overlooking cultivation consist of forest of better utility value and include hill slopes up to an elevation of about 1,400 feet. These forests are also heavily grazed by village cattle and resorted to illicitly by villagers for small timber for agricultural and building purposes. The forests principally consist of inferior deciduous species utilizable as fuel with an admixture of *Hardwickia binata,* often unsound and malformed. In favourable localities *Hardwickia* occurs in greater profusion.

35. *Plateau forests.*—The plateau forests include the Iskagundam, Morricheruvu and Guttalachenu plateaux, with an elevation of 2,100 feet, 1,900 feet and 1,400 feet, respectively. The Iskagundam plateau consists mostly of superior deciduous type of forest with bamboo of both varieties along stream banks. Trees attain respectable dimensions in and around Iskagundam camp. These forests are commercially exploitable. The Morricheruvu plateau, which is really an extension of the Pecheruvu plateau, supports mostly superior deciduous type of forest of small girth and low density in the western portions, while that part of the plateau which adjoins Nekkanti supports scattered *Hardwickia binata* trees of large dimensions mixed with inferior deciduous species. *Hardwickia* appears to be recessive on this portion of the plateau and regeneration and middle girth classes of this species are conspicuously absent. Bamboos occur along stream banks. The Guttalachenu plateau consists for the most part of *Hardwickia binata* type of forest with its associates *Anogeissus latifolia*, *Boswellia serrata*, etc. The species is intrusive and occurs generally scattered, though in places it is gregarious. Regeneration of this species is generally satisfactory. The undergrowth consists of grass of good fodder value. Bamboos occur along stream banks and in moist situations.

36. *Hill forests.*—The hill forests occur along the backbone of the Nallamalais. Here the vegetation is in general more luxuriant due to heavier rainfall. Tree growth consists of superior deciduous species of commercial value with a fair amount of natural regeneration. Bamboos, especially *Dendrocalamus strictus*, occur in abundance either as a pure stand or in mixture with timber species. Tall grass is plentiful, fires are common and virulent, giant creepers especially of *Bauhinia Vahlii* and *Milletia auriculata* form a menace to tree species.

37. *Vegetational types.*—The allocation of the forests of the division to definite ecological types is beset with difficulties due to considerable diversity in composition and density. The species composing the crop are numerous and varied, the transition from one type to another is sometimes gradual and at others abrupt, the changes in soil, rainfall, altitude, and those resulting from the chief causes of deterioration of the forest, viz., fire, grazing and mutilation by man are so abrupt or gradual that it is difficult to delimit the types with any great accuracy. Nor are the forests of the division so valuable or commercially important as to justify a detailed survey of the vegetational types. At the time of the preparation of this plan a preliminary stock map of the area was prepared wherein the following vegetational types have been recognized, and brief notes have been recorded below against each type.

38. *Thorny scrub.*—Due to excessive and continuous grazing by large herds of cattle and in roads of man for fire-wood, thorn and small timber, the forests near the villages have been so depleted of their stock that what is left behind consists of dwarfed specimens of thorny shrubs with a sprinkling of tree growth of the so-called valuable species, which are generally unsound, stunted and malformed. The species occurring in this type in the order of their frequency are—

Acacia latronum, Acacia sundra, Dichrostrachys cinerea, Acacia leucophloea, Zizyphus sp., *Flacourtia* sp., *Randia dumetorum, Randia uliginosa, Canthium parviflorum, Albizzia amara, Balsamodendron berryii, Pavetta indica, Grewia rothii, Mundulea suberosa, Dodonea viscosa,* etc. The undergrowth consists of grass which is continuously kept down by the famished village cattle. This type of forest affords a veritable picture of desolation during the summer months.

39. *Inferior deciduous type.*—By nomenclature this type is indicative of species utilizable for fuel and small timber. The trees seldom attain more than 25 feet in height and a girth of 2 feet, except in the case of occasional *Hardwickia* trees, which may attain larger dimensions, though usually unsound. The canopy is open and the density of stocking is moderate. The species composing this type are—

Anogeissus latifolia, Albizzia amara, Dalbergia paniculata, Acacia leucophloea, Chloroxylon swietenia, Protium caudatum, Hardwickia binata, Diospyros chloroxylon, etc. Natural regeneration is scanty. Unsoundness in trees is common probably due to inhospitable local factors. The undergrowth consists of grass of edible varieties which are readily eaten by village cattle.

40. The *Hardwickia binata* type as the name indicates comprises areas containing an appreciable distribution of *Hardwickia binata*. Two density classes have been differentiated on the stockmaps, dense and sparse, the former consisting of areas containing more than 25 trees per acre and the latter 25 trees and less. The principal associates of *Hardwickia* are: *Anogeissus latifolia, Boswellia serrata, Chloroxylon swietenia, Albizzia*

amara and other inferior deciduous species. In favourable situations *Hardwickia* forms a pure stand. Trees seldom remain sound above a girth of about 4 feet; the average height is about 35 feet. The medium girth classes are satisfactorily represented, natural regeneration is in places satisfactory and in others poor. On the Nekkanti plateau *Hardwickia* appears to be recessive yielding place to fast growing inferior deciduous species. The undergrowth consists invariably of dense grass of good fodder value which is grazed over by large herds of penta cattle.

Notes on Hardwickia binata (Yepi)—Factors affecting distribution.

41. *Fire.*—The wide distribution of *Hardwickia* and its occurrence in gregarious patches is a striking phenomenon which is not to be attributed solely to climatic or soil factors but to extraneous circumstances, viz., fires and grazing. The periodical occurrence of fires progressively destroys the less fire-hardy species, leaving a clean field for *Hardwickia binata*. In its early stages the species apparently makes very little growth above ground level, its energies being absorbed in entrenching itself below ground level to form a substantial root system. The annual fires do not therefore kill out the seedlings, which go on dying back till a substantial root system is developed capable of producing a vigorous shoot in one year so as to withstand oppression from the surrounding grass. In addition to eliminating competitive species, periodical fires help in preparing a clean seed bed for the reception of *Hardwickia* seed.

42. *Grazing.*—The effect of grazing on *Hardwickia binata* is to minimise competition from grass, and incidentally to reduce the severity of periodical fires which tend to damage the seedlings. The trampling of cattle helps to loosen the soil for the reception of the seed. Periodical fires are of common occurrence on grazing land and an assured water-supply is a necessary requisite for intensive grazing. The distribution of *Hardwickia* is generally confined to areas which are in the vicinity of perennial or semi-perennial streams, and which are subjected to intensive grazing and periodical fires.

43. *Development of root system.*—The capacity of *Hardwickia binata* seedlings to develop long tap roots capable of tapping moisture from low strata is an adaptation which helps in establishing the species on formations where other species may not thrive. The peculiar nature and stratification of the underlying rocks in the tract dealt with are such that rain water rapidly percolates through the soil and is readily drained off, with the result that seedlings have to tap sub-soil moisture from low depths for their sustenance. *Hardwickia* is well adapted to do this. The occurrence of *Hardwickia* in large numbers and purer in composition on shale or slate formations lends support to the above surmise.

44. *Ripening of seed.*—The seed of *Hardwickia* ripens on the trees in February and March and falls in April. Good seed years occur periodically, once in three to five years. Early rain is an important requisite if the seeds should germinate before losing their vitality.

45. *Essential factors.*—The factors essential for the successful regeneration of *Hardwickia* are therefore—

Good seed year,	Early rains after seed fall, and
Clean seed bed,	Freedom from oppression.

A synchronization of all the above requisites is a rare occurrence under natural conditions, and when they do coincide regeneration is obtained in gregarious patches resulting eventually in more or less even-aged pure stands.

46. *The superior deciduous type.*—This type of forest occurs generally between elevations of 1,500 and 2,500 feet. A considerable proportion of the total forest area of the division is composed of this type. The best of the superior deciduous areas occurs on the Iskagundam plateau where conditions of rainfall and soil appear suitable for the production of reasonably well-grown timber trees of commercial value. Even in this locality variations in quality are somewhat marked due probably to local and external factors. The hill tops and slopes support poor open growth, while valleys and the foot of the hills contain trees of fairly large dimensions and the crop as a whole appears close and well stocked. Trees generally attain a height of above 45 feet to 50 feet, and a girth of about four to five feet. Lower girth classes are moderately represented and natural regeneration of the principal timber species is generally satisfactory. The important tree species occurring in the crop are: *Terminalia tomentosa*, *Pterocarpus marsupium*, Teak, *Dalbergia latifolia*, *Anogeissus latifolia*, etc. Climbers, especially *Bauhinia vahlii* and *Spatholobus roxburghii*, are plentiful and often form a serious menace to standing growth. The undergrowth invariably consists of tall grass which periodically gets burnt. In moist situations and under closed tree canopy shrubs have replaced rank grass. *Phoenix sylvestris* is a common undergrowth in poor open fire-swept timber areas. The rest of the superior deciduous timber areas of the division consist of open growth of timber species of low girth and somewhat poor height. The factors of the locality appear to be incapable of producing trees of larger dimensions. Tree growth seldom attains a height of 40 feet and a girth of 3 feet except in moist and favourable conditions, and in association with bamboos, where trees attain larger sizes. The middle

girth classes are moderately well represented : regeneration of useful species, especially of *Pterocarpus marsupium* and *Terminalia tomentosa*, is abundant in many places, but it is periodically damaged by fires. Unsoundness in standing trees appears to be common, probably this is directly due to inhospitable local factors, more particularly to extremes of climatic variations and drought. Fires would appear to be a contributory factor. Generally trees above a girth of 3 feet do not appear to keep sound. These timber areas are at best capable of producing poles of timber species. The undergrowth in this type of forests consists of tall grass which forms both directly and indirectly a menace to the regeneration of timber species. *Phoenix* is another common undergrowth, especially in fire-swept areas. Valuable timber trees occur scattered in the midst of bamboos at higher elevations. The trees attain fairly large dimensions, about 50 to 60 feet, in height and 5 feet in girth. The exploitation of these scattered trees, though difficult, should be undertaken on a systematic basis lest they should be stolen by timber thieves. The species occurring in the superior deciduous type are : *Anogeissus latifolia, Terminalia tomentosa, Pterocarpus marsupium, Tectona grandis, Grewia tiliaefolia, Garuga pinnata, Odina wodier, Bassia latifolia, Terminalia bellerica, Dalbergia latifolia, Terminalia chebula, Sterculia urens, Sterculia villosa, Givotia rotteriformis, Miliusa velutina, Hardwickia binata* (scattered), etc.

The superior deciduous areas have been separately marked on the stock maps. At the time of preliminary stock mapping, a distinction was made between areas containing teak and those where teak is absent, and three classes were differentiated in each, viz., first-class, trees of and above 50 feet in height, factors suitable for clear-felling and planting, second-class trees of 35 to 50 feet in height and fit for selection felling, third-class trees up to 35 feet in height, open type fit for production of poles. These different classes were recognized for the purpose of forming suitable felling series and coupes, but since the depiction of the classes would complicate the maps, only the general type has been shown on the stock maps.

47. *Softwood species.*—The occurrence of softwood species such as *Givotia rottleriformis, Gyrocarpus jacquinii, Bombax malabaricum* and *Sterculia urens*, is a matter of some importance as the first three species are in demand in Markapur for the manufacture of slate frames, and the last species is valuable for the gum it yields. These species occur widely diffused in the superior deciduous areas, and on slopes overlooking cultivation. *Sterculia urens* is generally confined to stream banks. *Gyrocarpus* occurs in gregarious patches in moist localities. *Givotia* occurs in dry, rocky localities and the distribution of *Bombax* is general. At the time of preliminary stock mapping the position of softwood species was approximately located on the field maps to serve as a guide in the formation of coupes and series. These have not been shown on the stock maps as it would be cumbersome to do so. Regeneration and middle girth classes of *Givotia* appear to be deficient; probably the species is recessive in some localities. Another common softwood species which occurs in some profusion, but for which there is no demand at present, is *Cochlospermum gossypium*, a species which regenerates and coppices freely and occurs in gregarious groups in fuel forests. The utility of the fibre of this tree for the manufacture of paper is a matter for investigation.

48. *Sapindus trees.*—Special mention has to be made of the fairly widespread occurrence of *Sapindus emarginatus* (soapnut) trees in the inferior deciduous and *Hardwickia* types of forests, especially in the range of Ganjivaripalli. In the other ranges the species is not so abundant.

49. *Tamarind trees.*—Tamarind occurs along stream banks, on penta sites and on sites of abandoned cultivation, but the number of trees is not large.

50. *Semi-evergreen type.*—Along stream banks and near perennial water sources a sort of semi-evergreen type of forest consisting of mango, *Terminalia arjuna, Eugenia jambolana*, etc., is found.

51. *The bamboo type.*—Both the species, *Bambusa arundinacea* and *Dendrocalamus strictus*, occur in the division, the former occupying about 1/8th of the total effective bamboo area. *Bambusa* flowered and seeded gregariously over the entire division between the years 1935 and 1937, while *Dendrocalamus* flowered gregariously in certain localities and sporadically in others. In the localities of Chinnamantrala and Peddamantrala *Dendrocalamus* has flowered gregariously. The fairly common impression that *Dendrocalamus* does not flower gregariously is incorrect. In seeded areas regeneration of bamboo is coming up in dense masses and protection from fire and grazing will be necessary if the regeneration is to develop into clumps.

52. *Distribution of bamboo.*—The best bamboo areas occur on the Iskagundam plateau, and in the localities of Maddipenta and Rollapenta. On the Guttalachenu plateau the bamboo consists of the solid variety and is largely collected for goading and walking sticks. *Dendrocalamus* occurs in moist situations between elevations of 1,100 and 2,800 feet while *Bambusa* is confined to moist stream margins up to an elevation of 1,500 feet. Bamboos occur over fairly extensive areas almost pure; where the growth is sparse, tree species are found between the clumps. On the whole the clumps are

healthy, but over-exploitation takes place in the more accessible areas, while remoter ones are left unexploited. The two varieties of bamboo have been distinguished on the stock maps and in addition two density classes have been recognized in each, viz., dense, i.e., containing 50 and more clumps to an acre, and sparse, containing less than 50 clumps to an acre. The limits of dead bamboo area have also been shown.

53. *The sandal type.*—Sandal occurs naturally over an area of about 65 acres to the north of Thummalabailu in Dornal Range. This is an extension of the Pecheruvu plateau where it has been reported that sandal was in abundance at one time. Trees occur scattered and are less than 18 inches in girth. Sandal propagation plots have been raised in various localities under the former working plan. Their position has been located on the stock maps. The best of the plot are in the Guttalachenu plateau. Sandal exists in and around Diguvametta over an area of about 155 acres, probably as the result of sowings in 1910.

54. *Grasses.*—Any description of the forest would be incomplete without a general survey of the grasses occurring in the division, since one of the principal objects of management is grazing. Fortunately the grasses occurring in the forest mostly consist of edible strains of good fodder value, with the exception of a few varieties, especially of the lemon grass group and the elephant grass type, which occur over none too extensive an area. The elephant grass variety occurs in the moist timber areas on the Iskagundam plateau. The commonest grass in the division is the spear grass, which may be estimated to occupy about 60 per cent of the total area. Next in order of frequency is Nendra grass which may be put down at 20 per cent. Other types of fodder grasses occupy about 10 per cent and noxious grasses 10 per cent. Brief notes are recorded below on some of the more important grasses occurring in the division.

55. *Heteropogon contortus* (*Andropogon contortus*).—Banderugaddi, the common spear grass, occurs in abundance all over the division and grows in gregarious dense masses on slopes and hills. It grows to a height of about 3 to 4 feet. Till the time of its flowering in September cattle eat this grass greedily. The spears begin to appear in October when the cattle do not eat the grass till the spears are shed in January.

56. *Sehima nervosum* (Nendra gaddi), the best fodder grass occurring on the Nallamalais, is greedily eaten by cattle and is largely collected in head-loads and in cart-loads for stall feeding valuable cattle in the villages. The grass is somewhat gregarious in habit, occurs on fertile soils and under broken tree canopy, and grows to a height of about 4 feet.

57. *Chrysopogon montanus* (Morassa gaddi) is gregarious and occurs in fair abundance in the plains portions of the reserves, and is of good fodder value. Cattle eat the grass greedily both before and after it flowers.

58. *Andropogon pumilus* (Teynendra) is considered a good fodder grass, and is largely collected for fodder. It grows to a height of about 3 feet and is fairly abundant.

59. *Panicum trypheron* (gogadai gaddi) another variety of good fodder value, occurs in mixture with Nendra. It is not gregarious. It is collected for fodder.

60. *Eremopogon fœveolatus* (*Andropogon fœveolatus*) Karigaddi, usually called the tuft grass occurs only sparingly in dry situations. It is of fair fodder value.

61. *Aristida hystrix* is a short grass of gregarious habit and occurs in the plains areas in open forest. Cattle eat it when it is young.

62. *Apluda* variety (Golugulu) is a tall grass above 5 feet in height, which is found in favourable situations. It prefers moist localities and occurs on the plateaux in moist timber areas. Cattle eat this grass while it is young.

63. *Themeda imberbis* (elephant grass variety) grows to a height of 5 feet or so, and occurs in moist timber areas on the Iskagundam plateau. Cattle do not eat this grass.

64. *Cymbopogon coloratus* (Botha grass) occurs only in small quantities in exposed and deteriorated localities. Cattle do not ordinarily touch this grass but in years of scarcity of fodder they may nibble the tender shoots.

65. The following statement shows approximately the total area under each of the vegetational types recognized on the stock maps:—

Statement showing the distribution of vegetational types.

Serial number and range.	Superior deciduous.	Inferior deciduous.	Hard-wickia binata.	Scrub jungle.	Red sanders.	Sandal.	Bamboo.	Phœnix and grass.	Rock.	Blank.	Total.
	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.
1 Dornal	20,092	60,839	6,992	5,796	..	102	12,953	258	1,514	115	108,661
2 Gundlakamma	56,063	5,979	651	..	..	127	18,276	492	309	..	81,897
3 Giddalur	23,243	57,696	23,798	11,156	5,974	..	8,958	15	736	..	131,576
4 Ganjivaripalli	17,084	87,681	48,998	5,045	..	..	3,915	22	1,538	83	164,366
5 Turimella	26,036	42,100	15,403	12,405	..	93	10,604	354	822	..	107,817
6 Markapur	10,016	49,918	2,914	22,481	..	65	403	16	1,653	4,131	91,597
Total ..	152,534	304,213	98,756	56,883	5,974	387	55,109	1,157	6,572	4,329	685,914

SECTION 2.—INJURIES TO WHICH THE CROP IS LIABLE.

66. *Man.*—Though villages in the ordinarily recognized sense of the term do not exist within the reserved forests of the division, there are numerous Chenchu gudems, big and small, with liberal rights and concessions admitted at the time of settlement. One side of the reserves marches with the cultivation in the plains, wherein numerous villages are situated. A slow but steady degradation of the forests between the gudems and the cultivation in the plains appears to have been going on, on the one hand by the Chenchu who supplies the plainsmen below with the much needed small timber for agriculture and building construction, and on the other, by plainsmen, who illicitly indent on the forest for obtaining their requirements of dead fuel, thorns, manure leaves, small timber, etc. The Chenchus are allowed to keep goats inside the reserves while the plainsmen are forbidden to do so, with the result that all browsing in reserves is attributed to Chenchu goats. During summer, due to scarcity of grass fodder in the forests, *Hardwickia binata* trees are mercilessly lopped for feeding the cattle. The degradation of the forests on the outer slopes overlooking cultivation is directly ascribable to man. The damage done by the villagers to tree growth has resulted in the ruin of valuable grazing grounds adjoining cultivation so that village cattle have to resort to distant areas for day-to-day grazing.

67. *Animals.*—Grazing forms one of the principal demands of the local population. The incidence of grazing is in the neighbourhood of 10 acres per cow unit for the division as a whole, but areas adjoining cultivation and Chenchu gudems are intensively and continuously grazed over with the result that grass is perpetually low or absent and the grazing grounds have been ruined. The mechanical damage to the soil by cattle trampling on the surface and breaking seedlings or saplings is considerable. Browsing by sheep and cattle during the summer months and illicit browsing by goats cause damage to existing growth.

68. A list of forest offences is given below :—

Statement of forest offences in Kurnool East Division.

Year.	Number of offences under						Total.	Remarks.
	Grazing.	Fuel.	Manure leaf.	Small timber.	Illicit felling and removal.	Miscellaneous.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1927–28 ..	226	51	14	53	214	83	* 641	Includes Yerragondapalem Range also.
1928–29 ..	104	33	1	19	152	64	† 373	Figures for old Kanigiri Range not available.
1929–30 ..	162	25	..	14	196	103	† 500	Figures for Giddalur and Gundlakamma Ranges are not incorporated as the register is missing in the District Forest Office.
1930–31 ..	144	52	9	15	121	48	389	
1931–32 ..	169	50	5	16	136	44	420	
1932–33 ..	143	59	2	13	142	34	393	
1933–34 ..	186	129	6	30	237	89	677	
1934–35 ..	289	90	12	13	210	82	696	
1935–36 ..	154	63	32	11	154	52	‡ 466	
1936–37 ..	323	122	30	25	286	78	864	
1937–38 ..	247	126	31	6	285	112	807	

69. Statement showing particulars regarding illicit goat browsing inside reserves—

Year.	Number of cases detected.	Number of goats involved.	Year.	Number of cases detected.	Number of goats involved.
(1)	(2)	(3)	(1)	(2)	(3)
1927–28	* 42	* 971	1933–34	46	812
1928–29	24	706	1934–35	42	728
1929–30	32	695	1935–36	23	608
1930–31	50	1,693	1936–37	34	392
1931–32	48	1,577	1937–38	12	152
1932–33	24	446			

* Yerragondapalem range figures included.

70. *Fires.*—Fires are an annual problem in the division. Serious fires are observed to occur once in three years. Most of the fires in the forest are caused by man, either wilfully or accidentally. The more common causes are—

(*a*) escapes while fire tracing,
(*b*) late burning instead of early,
(*c*) burning by graziers,
(*d*) burning for the collection of minor forest produce,
(*e*) burning for easy access to the forests.

Annual fires are not an unmixed evil ; while the disastrous effects of severe fires in the timber forests on the West in killing out the seedlings and in injuring standing trees and causing unsoundness in them are a menace to the management, they are beneficial in the poorer forests of the division in promoting grazing and in maintaining the desired grass tree ratio.

71. A list of fire occurrences by ranges is given below :—

Statement of fires in Kurnool East Division.

Year.	Fires caused by accident or carelessness in burning fire lines.		Fires entering forests by crossing exterior fire lines.		Fires due to carelessnees or accident. By workmen engaged in forests or by purchasers of minor forest produce.		Fires due to carelessnees or accident. By villagers or travellers.		By Railway engines.		Intentional firing. For obtaining new grass.		Intentional firing. For game purposes.		Intentional firing. Malicious firing.		Causes unknown.		Total for the year.		Number of fires and area burnt in. Early burnt area.		Number of fires and area burnt in. Generally protected area.	
	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.	Number.	Area burnt in acres.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Dornal Range.																								
1932	..	..	..	..	..	..	1	75	..	..	..	..	..	..	..	..	..	..	1	75	1	75	..	..
1933	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	..	..	1	2	1	2	..	..
1934	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	72	..	..	1	72	1	72	..	..
1935	..	..	3	1,900	..	..	..	..	..	..	10	4,000	4	760	1	30	..	..	18	6,690	..	..	18	6,690
1936	..	..	1	400	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	400	..	..	1	400
1937	..	..	..	..	..	..	..	..	..	..	..	..	4	519	..	..	..	..	4	519	3	429	1	90
1938	..	..	..	..	1	800	2	420	..	..	2	214	..	..	..	..	..	..	5	1,434	3	414	2	1,020
Gundlakamma Range.																								
1929	..	..	2	860	..	..	..	..	..	..	..	..	..	..	..	..	3	288	5	1,148	3	472	2	676
1930	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1931	1	1	..	..	..	..	..	..	..	..	..	..	..	..	1	16	1	20	3	37	3	37	..	..
1932	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	147	6	580	7	727	4	510	3	217
1933	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1934	1	¼	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	¼	..	..	1	¼
1935	1	162	3	1,719	..	..	2	392	..	..	..	..	..	..	5	62,963	1	350	12	65,586	1	9,600	11	55,986
1936	..	..	..	..	1	50	1	300	..	..	1	300	..	..	..	..	..	..	3	650	3	650	..	..
1937	..	..	3	1,500	..	..	2	650	..	..	2	1,200	..	..	1	600	2	1,100	10	5,050	1	600	9	4,450
1938	2	750	1	500	1	150	3	570	1	600	..	..	..	..	8	5,700	..	..	16	8,270	6	1,620	10	6,650
Giddalur Range.																								
1929	..	..	1	62	..	..	..	..	..	..	..	..	..	..	..	..	2	94	3	156	2	94	1	62
1930	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1931	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1932	..	..	..	..	..	..	1	700	..	..	..	..	..	..	..	..	4	1,020	5	1,720	..	..	5	1,720
1933	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	500	4	1,480	5	1,980	1	80	4	1,900
1934	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	¼	1	¼	..	..	1	¼
1935	..	..	4	31,507	..	..	1	29	..	..	..	..	..	..	3	6,740	5	8,197	13	46,482	2	4,900	11	41,582
1936	..	..	..	..	..	..	..	..	..	..	7	2,450	..	..	2	480	..	..	9	2,930	5	2,200	4	730
1937	..	..	..	..	..	..	1	10 sq. chains.	..	..	1	35	..	..	..	..	19	10,162	21	10,197	4	2,422	17	7,775
1938	..	..	1	335	3	214	1	30	..	..	..	..	..	..	1	135	17	7,073	23	7,787	10	4,557	13	3,230
Ganjivaripalli Range.																								
1932	..	..	..	..	..	..	1	4	..	..	1	311	1	476	2	2,215	3	2,244	8	5,250	1	4	7	5,246
1933	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1934	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1935	..	..	..	..	..	..	1	1,500	..	..	2	394	2	2,122	2	3,940	2	1,166	9	9,122	..	..	9	9,122
1936	..	..	1	180	..	..	..	..	..	..	1	220	2	895	..	..	..	..	4	1,295	..	..	4	1,295
1937	..	..	..	..	..	..	..	..	..	..	..	..	6	1,730	..	..	3	363	9	2,093	1	1,000	8	1,093
1938	..	..	..	..	..	..	..	..	..	..	2	420	..	..	..	..	4	2,910	6	3,330	..	..	6	3,330
Turimella Range.																								
1932	2	31	..	..	..	..	3	487	..	..	6	2,993	..	..	..	..	1	354	12	3,865	1	1	11	3,864
1933	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	4	..	..	3	4	3	4	..	..
1934	..	..	..	..	..	..	3	59	..	..	..	..	..	..	..	..	..	..	3	59	3	59	..	..
1935	..	..	1	20	2	1,500	3	720	..	..	17	22,220	..	..	1	500	..	..	24	24,960	..	..	24	24,960
1936	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	70	..	..	1	70	1	70	..	..
1937	..	..	2	110	2	5	1	44	..	..	1	90	..	..	1	20	..	..	7	269	3	68	4	201
1938		..	..	..	2	23	3	113	..	..	2	120	..	..	4	330	..	..	11	586	7	286	4	300
Markapur Range.																								
1932	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15	20,480	15	20,480	..	..	15	20,480
1933	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	6,590	7	6,590	..	..	7	6,590
1934	..	..	..	..	..	..	5	1,157	..	..	..	..	..	..	1	1	..	..	6	1,158	2	2	4	1,156
1935	..	..	2	2,950	1	1,350	..	..	..	..	2	1,000	..	..	1	720	2	250	8	6,270	..	..	8	6,270
1936	..	..	..	..	..	..	..	..	..	..	2	150	..	..	..	..	2	400	4	550	..	..	4	550
1937	..	..	..	..	..	..	..	..	..	..	4	310	..	..	..	..	..	..	4	310	..	..	4	310
1938	..	..	..	..	2	1,390	..	..	..	..	1	50	..	..	..	..	..	..	3	1,440	..	..	3	1,440
Abstract for the whole division.																								
1932	2	31	..	..	..	..	6	1,266	..	..	7	3,304	1	476	3	2,362	29	24,678	48	32,117	7	590	41	31,527
1933	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	506	11	8,070	16	8,576	5	86	11	8,490
1934	1	¼	..	..	..	..	8	1,216	..	..	..	..	..	..	2	73	1	¼	12	1,289½	6	133	6	1,156½
1935	1	162	13	38,096	3	2,850	7	2,641	..	..	31	27,614	6	2,882	13	74,902	10	9,963	84	159,110	3	14,500	81	1,44,610
1936	..	..	2	580	1	50	1	300	..	..	11	3,120	2	895	3	550	2	400	22	5,895	9	2,920	13	2,975
1937	..	..	5	1,610	2	5	4	695	..	..	8	1,635	10	2,249	2	620	24	11,625	55	18,438	12	4,519	43	13,919
1938	2	750	2	835	9	2,577	9	1,133	1	600	7	804	..	..	13	6,165	21	9,983	64	22,847	26	6,877	38	15,970

72. *Plants.*—Large areas of the forests were formerly overrun with prickly-pear. This has been eradicated by the cochineal insect since 1932. Here and there straggling clumps are coming up. Lantana does not occur in the division.

73. *Psida acuta* forms a dense matting in penta sites to the exclusion of grass or tree growth. *Pterolobium* and *Acacia pennata* occur in a few favourable localities. *Bauhinia vahlu* climbers form a menace to valuable timber trees.

74. *Strobilanthes* occurs in gregarious patches in some of the moister localities of the division, effectively preventing regeneration of tree species.

75. *Drought.*—Extremes of climatic variations and periodical visitations of prolonged drought retard plant growth and probably cause defect in the wood.

CHAPTER III.—UTILIZATION OF THE PRODUCE.

SECTION 1.—AGRICULTURAL CUSTOMS AND WANTS OF THE LOCAL POPULATION.

76. *Agricultural customs.*—Agriculture forms the principal occupation of the local population. Cattle breeding, sheep farming and goat rearing form subsidiary occupations of the agriculturists, who find it difficult to subsist on agriculture alone. Crop production is low due to poverty of the soil and precarious rainfall. Large areas have to be cultivated to make individual holdings economic. Rotational cultivation is practised since the soil is incapable of supporting a crop continuously, unless heavily manured. Most of the cultivation consists of the dry type. Wet cultivation is practised under tank and well irrigation. Generally food crops are cultivated, while cash crops form an insignificant percentage of the total production. The crops raised consist of korra (*Setaria itabcca*), Jonna (*Sorghum* spp.), Sajja (*Pennisetum typhoides*), cotton, paddy, ragi (*Eleusine corocana*), Origalu (*Panicum mitiacum*), Uluva (horsegram), Arika, casor, hemp, chilly, tobacco, etc. Only one crop is raised on unirrigated lands, while under well irrigation two or three crops are raised. Alternation of crop is practised under well irrigation. Paddy is raised under tank irrigation, the most important tanks being those at Cumbum and Markapur. A second crop of paddy is raised, provided there is adequate supply of water in the tanks. Water from wells is baled out by means of piccotahs. Bull power is used for lifting the water. The population of the taluks of Markapur and Cumbum is roughly 240,984 and the area under dry cultivation is 250,300 acres while that under wet cultivation is 16,400 acres. The standard practice in dry cultivation is to plough the fields as soon as early showers of rains have fallen, manure them to the extent to which manure is available, and sow the seeds of the field crop, which very often consists of a mixture of species, in August or September. Agricultural practices are still primitive, owing to the backwardness of the people and the inhospitable local conditions. The field crop is usually harvested in December–January and thereafter the lands lie fallow till the next season. Under tank irrigation two or three crops are generally raised, depending on the availability of sufficient water in the tank. Paddy fields are manured with green manure leaves before a second crop is raised. The first crop of paddy is raised between the months of July and November, while the second crop is raised between November and April.

77. *Requirements of the population.*—The requirements of the local population are—

(*a*) land for expansion of cultivation,
(*b*) grazing and penning facilities,
(*c*) small timber for agricultural purposes and for building construction,
(*d*) manure leaves,
(*e*) thorn and small firewood,
(*f*) materials for cart-making,
(*g*) grass fodder, and
(*h*) bamboos.

78. *Land for expansion of cultivation.*—A pressing demand of the local population, especially in a few localities, is for the grant of land from reserved forests for expansion of cultivation. Economic distress is acute in Markapur taluk and more especially in its eastern part, where the poverty of the soil accentuated by precarious and often fitful rainfall renders productivity low with the result that large areas have to be cultivated to make individual holdings economic. Increase of population during the last two decades has intensified the prevailing economic distress.

79. *Grazing and pending.*—The agricultural soil is shallow, stony and impoverished, and requires heavy manuring. Large herds of cattle are kept for the sake of the manure they yield, and for purposes of breeding. Sheep and goats are kept for the manure

they yield and for sale. They are bought for slaughter by merchants from Bangalore and Madras. Buffaloes are kept in villages for dairy products and manure. On an average the number of animals which graze in the forests is—

Cows and bulls	26,440
Buffaloes	5,590
Sheep	39,040
Total ..	71,070

Total reduced to cow units 56,886. With the fall of the early showers of rain in May, the cattle commence to migrate to the pentas (cattle pens) in the interior in search of fresh pasture, where they remain till the crops are harvested in the plains. Mostly cows and a few buffaloes resort to the pentas, while most of the buffaloes, agricultural bulls and sheep are kept in the villages throughout the year, and resort to day grazing in the forests within their reach. Facilities for grazing and penning are therefore important demands of the people, and the requirements of silviculture have to be compromised to meet this demand.

80. *Small timber.*—The demand for small timber for agricultural purposes and for house construction is large and widespread; the forests near the villages have been so degraded that there is hardly any material fit for small timber left in them, and the people persist in resorting to thieving and other illegal practices in spite of the vigilance of the protective staff. Agricultural implements consist of the plough-share (Nagelu), shaft (Nageti nogalu), Yoke (Nagai kadimanu), the weeder (Danti dindu) the clod breaker (Garitika dindu), etc. The species of trees popularly used for this purpose are: *Hardwickia binata, Anogeissus latifolia, Chloroxylon swietenia, Acacia leucophlœa* and *arabica, Azadirachta indica*, etc. The ryots are fastidious about the selection of the ploughshare. The difficulty in supplying this agricultural implement to suit individual predilections is great. Usually pieces of timber with a girth of 18 to 20 inches and having a natural bend of 130° to 160° and a length of 2 to 3 feet are considered suitable. 'Nageti Nogalus' are of standardized dimensions and are hewn out of *Hardwickia* timber. Rafters and small posts are in demand for small house construction. Trees of about 18″ in girth and of the following species. *Anogeissus latifolia, Chloroxylon swietenia, Cleistanthes collinus, Soymida febrifuga*, and with a minimum length of 9 feet are considered suitable for the purpose. House posts are made out of *Hardwickia binata* and *Terminalia tomentosa*.

81. *Manure leaves.*—A fairly large demand for manure leaves exists in the localities of Cumbum and Markapur, for manuring wet lands before a second crop of paddy is raised. The species used for manure leaf are *Pongamia glabra, Tephrosia purpurea, Mundulea suberosa, Dodonea viscosa, Cassia auriculata, Grewia rothii, Wrightia* sp., *Calotropis gigantea*, etc.

82. *Thorn and small firewood.*—Thorns are in demand, especially for the purpose of fencing gardens and wet cultivation. The demand is fitful and is to some extent met from unreserves. Recent attempts at leasing defined coupes for the collection of thorns have proved abortive. Except in the rural centres of Markapur, Cumbum, and Giddalur where forest firewood commands a reasonable price, the demand for it in villages is small, and is to a large extent met by supplies from unreserves and private lands. Cow-dung cakes and stalks of field crops are used as substitutes for fuel by the poorer classes, although such a measure is wasteful of manure and valuable cattle fodder. Illicit collection of dead wood from the reserves is practised by villagers living near the forests.

83. *Materials for carts.*—Cart making is an important and a lucrative local industry, especially in the plains of Papinenipalli and Akavidu. The species most commonly used for this purpose are *Pterocarpus marsupium* and teak. Timber thieves, especially those living in the plains of Turimella range, make a regular living by the supply of stolen wood from the Gundlakamma Range. Their method of felling and conversion is ruthless and wasteful. Spokes and felloes are converted in the forest and transported to the villages in the plains for sale.

84. *Grass fodder.*—Bulls used for agricultural purposes seldom resort to the forests for grazing, partly because they are required for work, and partly since there is a risk in sending valuable cattle to forest where tigers and panthers form a menace. Buffaloes are invariably kept in the villages, and they resort to the neighbouring forests for day grazing. Villagers collect fodder grass in the interior parts of the forest for stall feeding their more valuable cattle. Every important village sends out 30 to 40 men, women and children every day to the forests, in the early hours of the morning for the collection of fodder grass, and they return to the villages before midday with heavy bundles carried on their backs weighing about 60 lb. each bundle. Where road communications exist grass fodder is transported in carts.

85. *Bamboos.*—Bamboo is the poor man's timber and is used for a variety of purposes such as posts, rafters, fencing materials, basket making, walking and goading sticks, tobacco hangers, etc. The local demand is not great and is more than amply met from the extensive bamboo areas in the division.

86. *The Chenchus.*—Besides the local agricultural population in the plains, a class of hill tribe called the Chenchus live on the hills, or on the borders of the forests. Their chief occupation is collection of minor forest products and goat rearing. They are a semi-nomadic tribe, living on the produce of the forest, but in recent years, consequent on reclamation work undertaken by the State at considerable expense, some of them have taken to cultivation and their children are given education. Their chief requirements are—

(*a*) land for expansion of cultivation,
(*b*) advances for purchase of bulls,
(*c*) permission to increase their herds of goats, and
(*d*) entire monopoly over minor forest products.

There are no Chenchus in Giddalur Range, and only a small new settlement exists in Gundlakamma Range.

SECTION 2.—MARKETS AND MARKETABLE PRODUCTS.

87. *Cattle breeding.*—Cattle breeding is an important and lucrative industry. Grazing is therefore an important requirement of the local population. The sale of grazing permits brings in a large amount of revenue. Large number of foreign cattle from the neighbouring districts of Guntur and Nellore resort to the forest of Kurnool East for penning, during the latter half of the year.

88. *Basket-making.*—The making of baskets for a variety of uses, especially for the collection of cotton is an important cottage industry. For this purpose bamboo splits are obtained in rural centres from the bamboo contractors, or the Erukalas and Medaras themselves go to the bomboo coupes and obtain the necessary material through the contractors.

89. *Slate manufacture.*—The manufacture of slates (largely for use in schools) is a lucrative cottage industry at Markapur. Slates are at present quarried from the neighbouring zamindari or shrotriyam lands. Soft wood timber is supplied from Kurnool East Division, as well as from Chelama range in Kurnool West, for conversion into slate frames and boxes for packing. During recent years due to competitive supplies of slate frame wood from Kallai and Hyderabad at extremely low rates, the demand for local wood has slumped considerably, the resources of the local departmental reserves are not so great as to compete with supplies from outside sources. The total requirement of the slate industry at Markapur is 60,000 cubic feet of soft wood timber per annum, but because the stocking of soft wood is poor, the Forest department has been supplying only about 8,000 cubic feet. The annual turnover of business in slates at Markapur is valued at Rs. 1,50,000.

90. *Jaggery-making* is a small local industry at Cumbum, which consumes small quantities of twigs for boiling the sugarcane juice. The pulp left after crushing the cane is used for fuel, and is supplemented by twigs obtained in the collection of manure leaves.

91. *Timber.*—Timber may be classified into—

(*a*) large timber,
(*b*) poles, and
(*c*) small timber.

Large timber is utilized for big constructional works and for cart-making. The species generally used for these purposes are teak, *Terminalia tomentosa* and *Pterocarpus marsupium* of and above four feet in girth. The localities where such timber can be obtained from are the Iskagundam plateau, and the bamboo areas along the backbone of the Nallamalais. A considerable quantity of big timber is imported from external markets into Giddalur, Cumbum and Markapur. It should be possible for the Kurnool forests to supply these local markets if exploitation is expanded.

92. *Poles.*—Poles of valuable timber species such as *Terminalia tomentosa*, teak, *Pterocarpus marsupium* and *Anogeissus latifolia*, between girths of 12 inches and 30 inches, command a ready and remunerative local market. Export of such poles may be made to external markets like Guntur, Narasaraopet, Ongole, Bapatla and Bellary, where even this sort of timber is scarce. Most of the timber areas on the Nallamalais are capable of producing only poles, and the more important localities where exploitation is systematically undertaken are Mogilutala, Iskagundam, Malakondapenta and Sandrapodu.

93. *Small timber.*—By small timber is meant species of inferior quality such as *Anogeissus latifolia*, *Acacia*, *Albizzia*, *Chloroxylon*, *Cleistanthus*, *Hardwickia*, etc., between 12 inches and 24 inches in girth, largely used for agricultural implements and

construction of small houses. The demand for such timber is great and the entire output of the division is consumed in rural centres, nothing being exported to external markets. The localities where such small timber areas occur are the Guttalachenu plateau, Chintala valley, Nallagunta, Papinenipalli, Diguvametta and Sanjivaraopet. The bigger sized trees of *Hardwickia binata*, provided they are sound and contain enough heartwood, are converted into house pillars, beams and door frames.

94. *Annual local requirement of timber.*—The annual timber requirements of the rural centres in this division is estimated to be about 70,000 cubic feet.

95. *Firewood.*—The only rural centres which consume forest firewood are Markapur, Cumbum and Giddalur. Markapur obtains its supplies from zamindari and shrotriyam forests, since the reserves are far away and communications are in such an appalling state, that exploitation from reserves cannot at present compete with private supplies. Within the next decade or so, private supplies are likely to dwindle to such an extent that the price for forest firewood may appreciate sufficiently to make exploitation remunerative. Cumbum and Giddalur, which were hitherto obtaining their fuel requirements from private shrotriyam and extensive unreserves, have nearly exhausted these sources of supply, as is amply evidenced by the almost bare hill sides adjoining these two townships. As a result, they have recently resorted to departmental reserves for firewood. Small rural centres do not take forest firewood as the people are poor and cannot afford to pay for fuel. The present average annual fuel requirements of Markapur, Cumbum and Giddalur are 1,400, 1,850 and 2,280 tons, respectively.

96. *Charcoal.*—This is used both for cooking purposes and for burning lime; a small demand for it exists in the localities of Markapur, Cumbum and Giddalur, to the extent of 600, 400 and 400 bags, respectively, per annum. Contractors of fuel coupes will be permitted to make charcoal on approved sites in fuel coupes for supplying this local demand. In addition a fairly extensive market for charcoal exists in Guntur and Narasaraopet. *Hardwickia binata* charcoal is much favoured in these two towns, and commands a higher sale value than charcoal of other species. To start with the forest in the Telugurayanicheruvu valley will be exploited, on a small scale, to supply these external markets.

97. *Bamboos.*—Both *Bambusa arundinacea* and *Dendrocalamus strictus* occur in the division but the former flowered and seeded gregariously and generally over the entire division in recent years with the result that the regrowth will not become exploitable during the period of this working plan. *Dendrocalamus* flowered and seeded gregariously only in a few localities. The bamboos produced in this division are used for a variety of purposes, including basket-making, and construction of thatched huts. Erukalas and Medaras from the plains of Nellore and Guntur, as well as from the villages in Kurnool district, resort to the bamboo coupes during the months of January to March, and cut and split bamboos after paying the contractor a stipulated royalty, and transport them to their villages on donkeys or in carts for purposes of basket-making, making cart roofs and a variety of other uses. A large proportion of the local output of bamboo is exported to distant markets like Guntur, Narasaraopet, Bellary and Anantapur by rail, and to Ongole and Bapatla by road. Contract enterprise replaced departmental exploitation about ten years back, and it should be possible to stimulate bamboo working on a more intensive scale. Much of the solid variety of bamboo produced in the division is exported to Bapatla for use as "tobacco hangers."

98. *Minor forest products.*—Tamarind fruits and soapnuts (fruits of *Sapindus emarginatus*) are two important items of minor produce which, besides amply meeting local requirements, are exported to the coastal districts. Tangedu (*Cassia auriculata*) bark is collected in fairly large quantities from the unreserves and from some of the open parts of the reserves, where it grows, and is exported to markets like Madras, Salem, Vellore, etc., for tanning purposes. *Dyospyros melanoxylon* leaves (beedi leaves) and *Bauhinia vahlii* (platter) leaves are collected and exported for the manufacture of beedies and for making plate leaves. Honey and wax are collected in small quantities and are consumed locally. *Sansiviera roxburghiana* (Saganara) which occurs in fair abundance in Ganjivaripalli range, and yields a valuable fibre, is not exploited at present. The gum of *Sterculia urens* is a valuable minor produce which commands a ready and remunerative market in Bombay. Though the trees occur in this division, exploitation of the gum has not been attempted in the past. Seeds of *Buchanania latifolia* (Sarapappu or Cuddapah nuts) are collected and sold locally. Mining licences have been granted in the Veligondas for collecting manganese and barytes ores. The manganese ore is believed to be of a superior quality. The demand for barytes in recent years has been negligible but the market appears to be reviving.

SECTION 3.—LINES OF EXPORT.

99. *Railway.*—The Guntakal-Masulipatam metre gauge railway line passes through the division, and the more important railway stations from which export of bamboos, timber, slates, minor forest products, etc., is done are Diguvametta, Giddalur, Cumbum

and Markapur road. This railway is an important communication between the West Coast and East, and traverses the dry timberless districts of Guntur and Bellary, to which exports from the Nallamalais can be made.

100. *Roads.*—The Mantralakanama ghat road and its continuation *via* Dornal to Thokapalle and Markapur, forms the main artery of communication from the forests of Dornal to the railhead. The Nandikanama ghat road via Diguvametta and Giddalur is another important road communication from the forest to the plains of Nellore and Ongole. The road from Thokapalle to Vinukonda links the easternmost parts of the division with Guntur district. The Cumbum-Papinenipalli cart-track, which hitherto has been offering considerable difficulty for bullock cart traffic due to difficult sections and rugged surface, is being converted into a village road by the local board authorities. This will offer facilities for the transport of forest produce from Maddipenta and Papinenipalli to the railhead at Cumbum. The following is a list of other more important roads used for the transport of forest produce :—

1	Mogilutla-Nallaguntla road	Forest road.
2	Peddachama-Chintala-Dornal	Do.
3	Thummalabailu-Chintala	Do.
4	Chinnamantrala-Eguvacherlopalli ..	Do.
5	Telugurayanicheruvu-Ganjivaripalli ..	Do.
6	Regumanipenta-Ganjivaripalli	Do.
7	Cumbum-Markapur	Local Fund.
8	Iskagundan-Diguvametta ..	Forest road.
9	Diguvametta-Sandrapodu	Do.

SECTION 4.—METHODS OF EXPLOITATION AND THEIR COST.

101. *Exploitation of timber.*—Selection coupes in the Iskagundam plateau, which supply timber of large dimensions are sold to a contractor at so much per acre. The contractor undertakes the felling and conversion of marked trees, and their transport. The rate paid for felling and conversion is—

	Per cubic foot. RS.	A.	P.
Teak, Yegi (*Pterocarpus marsupium*), Ganapa (*Adina cordifolia*).	0	1	0
Rosewood and Maddi (*Terminalia tomentosa*)	0	2	0

The above rates include cost of stacking the top ends and slash on rab patches. The cost of transport to Diguvametta by bullock carts over an average distance of 22 miles is 4 annas per cubic foot.

102. *Spokes and felloes.*—For conversion into spokes and felloes from the selection coupes, the contractor pays the following rates :—

	Per set. RS.
Pterocarpus marsupium	6
Teak	5
Rosewood	7

and the cost of transport to Diguvametta is Rs. 2 12 0 per set.

103. *Poles.*—The pole coupes in the localities of Iskagundam, Malakondapenta, Sandrapodu and Mogilutala are sold on an area basis to contractors, who do the felling and transport. The rates paid in the various localities are given below :—

Locality.		Rate for felling per cubic foot. RS. A. P.	Rate for transport.
Iskagundam ..	Teak, Yegi (*Pterocarpus marsupium*).	0 1 0	..
	Rosewood and Maddi (*Terminalia tomentosa*)	0 2 0	..
Malakondapenta.	....	..	..
Sandrapodu ..	....	..	..
Mogilutala ..	....	0 2 0	0 5 0 per cubic foot, to Markapur.

104. *Small timber.*—The exploitation of small timber is undertaken departmentally in most of the localities where Chenchu labour exists. In one or two localities marked trees are sold to a contractor, who does the felling and transport. The rate for the collection of rafters of first-class species varies from Rs. 4–11–0 to Rs. 9–6–0 per 100, while for the second class it varies from Rs. 4–2–8 to Rs. 7–13–0. A rate of Rs. 0–11–0 is paid for each Naget Nogalu. The cost of exploitation of the various kinds of agricultural implements and timber for house building purposes, which are commonly exploited by the contractors from the coupes is given below. It is obligatory on the part of the coupe contractors to sell these timbers at the edges of the coupes to ryots for their *bona fide* agricultural and domestic requirements, at rates which do not exceed the cost of collection given below plus a proportion of the royalty paid to the Forest department by the contractors.

Particulars.	Species.	Cost of collection rate. RS. A. P.	
	CART MATERIALS.		
1 Spokes and felloes (per set of 24 spokes and 12 felloes).	Teak, Yegi (*Pterocarpus marsupium*).	6 0 0	Per set.
2 Bandinoga (cart pole)	Nallamaddi	0 2 0	Each 0·75 c.ft.
3 Bandikadi (Yoke)	Chikrani and Battaganapu (*Stephegyne parvifolia*).	0 4 0	Each 0·5 c.ft.
4 Bandiparamkommalu (side shafts).	Nallamaddi (*Terminalia tomentosa*), Biludu (*Chloroxylon swietenia*) and Nallatimma (*Acacia leucophlœa*).	0 8 0	Each 1·5 c.ft.
5 Paranpattah (cart frame pieces) ..	Yegi (*Pterocarpus marsupium*), Chirumanu (*Anogeissus latifolia*), Biludu (*Chloroxylon swietenia*), Jittegi (*Dalbergia latifolia*).	0 0 6	Each 0·25 c.ft.
6 Donimoddu	Tumma (*Acacia arabica*), Vepa (*Melia azadirachta*), Jittegi (*Dalbergia latifolia*), Dirsinam (*Albizzia lebbek*), etc.	0 8 0	Each 2·00 c.ft.
7 Bandikundalu (naves)	Billudu (*Chloroxylon swietenia*) ..	0 5 0	Each 1 c.ft.
	AGRICULTURAL IMPLEMENTS.		
1 Nageti (plough share)	Tumma (*Acacia arabica*), Biludu (*Chloroxylon swietenia*) Chinduga (*Albizzia odorotissima* and *stipulata*), Yepi (*Hardwickia binata*), etc.	0 12 0	Each 1 c.ft.
2 Nageti noga (plough shaft) ..	Somi (*Soymida febrifuga*), Nallamaddi (*Terminalia tomentosa*), Yepi (*Hardwickia binata*).	0 12 0	Each 0·75 c.ft.
3 Nageti kadimam (Yoke)	Chikreni and Battaganapu (*Stephegyne parvifolia*).	0 4 0	Each 0·5 c.ft.
4 Pedda guntika dindu (Clod breaker).	Yepi (*Hardwickia binata*)	0 8 0	Each 2 c.ft.
5 Chinna guntika dindu	Do.	0 4 0	Each 6·5 c.ft.
6 Guntika noga	Nallamaddi (*Terminalia tomentosa*).	0 4 0	Each 0·75 c.ft.
7 Pedda gorru dindu	Sundra (*Acacia sundra* and *ferruginea*) and Yepi (*Hardwickia binata*).	0 3 0	Each 0·5 c.ft.
8 Pedda gorthi noga	Billudu (*Chloroxylon swietenia*), Yepi (*Hardwickia binata*).	0 4 0	Do.
9 Gorthi antu noga	Billudu (*Chloroxylon swietenia*), Yepi (*Hardwickia binata*), Jittegi (*Dalbergia latifolia*), Sundra (*Acacia sundra* and *ferruginea*).	0 2 0	Each 0·5 c.ft.
	BUILDING MATERIALS.		
1 Nitradu (shaped posts)	....	0 4 0	Each.
2 Gunjalu (shaped rafters)	....	0 1 0	,,
3 Dwara bandamu (door frames) ..	Yepi (*Hardwickia binata*), Nallamaddi (*Terminalia tomentosa*).	1 4 0	Each 2 c.ft.
4 Beams—			
First class	Teak, Nallamaddi (*Terminalia tomentosa*), Yepi (*Hardwickia binata*), Rudra ganappa (*Adina cordifolia*).	0 10 0	Each 10 c.ft.
Second class	Chirumanu (*Anogeissus latifolia*), Battaganapa (*Stephegyne parvifolia*), Chinduga (*Albizzia odorotissima* and *stipulata*), Vepa (*Melia azadirachta*).	0 10 0	Do.
5 Round rafters—			
First class	....	0 0 8	Each 1·75 c.ft.
Second class	....	0 0 6	Do.
6 Vasalu (small round rafters) ..	....	0 0 6	Each 0·25 c.ft.
7 Kurnool pillars—			
First class	....	0 2 0	Each 3·75 c.ft.
Second class	....	0 2 0	Each 3 c.ft.

105. *Fuel.*—Fuel coupes are worked by contractors who do the felling, stacking and heaping of the debris, and issue permits to individual cartmen at a rate varying from Re. 1 to Rs. 2 per cart-load, who do the transport to centres of consumption. A rate of Re. 0–12–0 per cart-load for felling and collection of fuel is usually paid by the contractors.

106. *Bamboo.*—Bamboos are annually leased to contractors, who do the felling and transport. Sometimes Erukalas and Medaras from the plains take permits from the contractors for felling bamboos and conversion into splits. They pay a rate of Re. 1 to the contractor per bundle of splits. Nekkanti series is exploited departmentally through Chenchus, who are paid for collection at standard rates and the produce is sold periodically

to the ryots, at recognized places, at scheduled rates. The following statement gives full particulars of the cost of collection and selling rate for the various kinds and qualities of bomboos :—

Statement showing the cost of collection of the various classes of bamboos and the rates obtained in sales.

Species used. (1)	Description of produce collected. (2)	Cost of collection. (3)	Selling rate (4)	Dimensions. (5)	Remarks. (6)
		RS. A. P.	RS. A. P.		
Bambusa arundinacea.	Scaffolding bamboos.	0 1 0 each.	0 2 0 each. to 0 9 0	Length 15′ to 20′; girth 6″ to 12″.	
	Kavadi dabbalu ..	0 0 9 ,,	0 3 3 ,,	Length 9′ ; width 3″.	
	Cot splits	0 0 6 ,,	0 8 6	Length 6′ ; width 3″ ..	2 splits are made of one piece.
Dendrocalamus strictus.	Bamboos, I class ..	1 14 0 per 100	5 0 0 100	Length 18′ and above ; girth 6″ and above.	
	Bamboos, II class ..	1 0 0 ,,	3 0 0 100	Length 14′ to 18′ ; girth 4½″ to 6″.	
	Bamboos, III class ..	0 8 0 ,,	0 14 0 100 to 2 0 0	Length 14′ to 18′ ; girth 4″ and below.	
	Mullukarralu (goading sticks).	0 6 0 to 0 8 0 ,,	0 12 0 100 to 1 9 0	Length 10′ to 15′ ; girth 1″ and below.	
	Pattudu kattalu (walking sticks).	0 8 0 ,,	1 0 0 100 to 1 12 0	Length 10′ to 18′ ; girth 1 to 2½″.	
	Erikala splits ..	6 0 0 Per cart-load.	17 8 0 per cart-load.	Length 18′ and above ..	1 cart-load contains 24 bundles —four splits are made of one bamboo.
	Medara splits ..	4 8 0 ,,	12 0 0 ,,	Length 12′ to 18′	1 cart-load contains 12 bundles —four splits are made of one bamboo.

107. *Manure leaf and thorns.*—Permits are issued for the collection of manure leaves and thorns at the rate of Rs. 2 and annas five per cart-load respectively. The cost of collection of one cart-load of manure leaf is Re. 1 and transport over a distance of 20 miles to Cumbum is Rs. 2. There it is sold to the ryots at Rs. 3–8–0 to Rs. 4 per cart-load.

108. *Fodder grass.*—Collection of fodder grass for *bona fide* domestic requirements is allowed free of charge in head-loads and permits are issued for collection in cart-loads at the rate of 5 annas per cart-load. Four coolies are generally employed on cutting and collecting one cart-load of fodder grass, at the rate of 4 annas per coolie or Re. 1 per cart-load. Villagers usually transport the grass in their own carts.

109. *Grazing and penning.*—Permits are issued annually for the privilege of grazing and penning within the reserved forests of the division at the prevailing rates.

110. *Minor forest produce.*—Chenchus have a right of pre-emption over the following minor forest products occurring within the Chenchu gudem enclosures: kunkudu, tamarind, myrobolams, honey, wax, nuxvomica, etc. The right to buy minor forest products from the Chenchus at recognized rates is sold in public auction to a contractor, who organizes the collection and transport. The following statement shows the rates at which the contractor is bound to pay the Chenchus and these rates are periodically revised by the District Forest Officer in consultation with the Collector :—

	RS. A. P.	
Tamarind shelled	0 2 3	per quarter.
Do. unshelled	0 5 0	do.
Kunkudu [*Sapindus trifoliatus* (syn) *emaginatus*]	20 0 0	per putty of 640 measures.
Mushti (*Strychnos nux-vomica*)	0 1 0	per measure.
Honey	0 8 0	do.
Wax	12 0 0	per quarter.
Sarapappu (*Buchanania latifolia* and *augustifolia*)	1 0 0	per measure.
Karakailu (*Terminalia chebula*)	20 0 0	per putty.
Kaunga seed (*Pongamia alabra*)	30 0 0	do.
Ippa flower (*Bassia latifolia*)	0 0 6	per measure.
Gum	0 9 4	per quarter.
Horns	1 12 0 to 4 8 0	per maund.
Chilla ganjalu (*Strychnos potatorum*)	20 0 0	per putty.

The exploitation of tangedu (*Cassia auriculata*) bark, Rela (*Cassia fistula*) bark, Madapa (*Bauhinia vahlii*) leaves and Tumki (*Diospyros melanoxylon*) leaves is done by contractors who pay for collection at the following rates :—

	RS. A. P.			RS. A. P.	
Tangedu bark ..	10 0 0	per putty of 640 measures.	Madappa leaves ..	0 8 0	per maund.
Rela bark ..	8 0 0	per 500 lb.	Tumki leaves ..	0 6 0	per 100 bundles of leaves.

SECTION 5.—PAST AND CURRENT PRICES.

111. *Prices for coupes.*—The following statements show the prices realized for the timber, fuel and bamboo coupes in recent years :—

Past and current prices of timber coupes.

Gundlakamma Range.

Year.	Vedurlakonda series.				Melakondapenta series.				Iskagundem series.				Sandrapodu series.				Mamidigudem series.				Bodi series.			
	Coupe number.	Area worked.	Revenue.	Rate per acre.	Coupe number.	Area worked.	Revenue.	Rate per acre.	Coupe number.	Area worked.	Revenue.	Rate per acre.	Coupe number.	Area worked.	Revenue.	Rate per acre.	Coupe number.	Area worked.	Revenue.	Rate per acre.	Coupe number.	Area worked.	Revenue.	Rate per acre.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.
1925–26	I	130	1,365	10 8	I	147	1,544	10 8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1926–27	II	102	944	7 14	II	117	1,112	8 11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1927–28	III	108	1,404	11 11	No demand.																			
1928–29	IV	116	1,536	12 0	Do.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1929–30	V	88	836	7 10	III	49	1,000	6 4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	..	..	IV	136	949	5 15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1930–31	VI	18	1,034	11 0	V	68	748	5 8	I	47	564	12 0	I	51	1,550	30 8	I	43	731	17 0	No demand.			
1931–32	II	76	..	..	VI	130	130	6 4	II	50	613	12 4	II	54	648	12 0	No demand.							
					VII	170	850	5 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1932–33	VII	120	840	7 0	VIII	140	700	5 0	III	56	756	13 8	III	56	896	16 0	II	83	374	4 8	I	43	108	2 8
1933–34	VIII	68	459	6 12	IX	78	105	10 2	IV	39	975	25 0	IV	46	920	20 0	III	52	1,300	25 0	No demand.			
1934–35	IX	62	450	3 14	X	95	665	7 0	V	46	840	18 4	V	70	1,925	25 0	IV	34	770	19 4	II	60	120	2 0
1935–36	X	51	374	4 8	XI	58	493	8 8	VI	57	1,311	23 0	VI	52	676	13 0	V	45	698	15 8	No demand.			
	XI	32	397	6 8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1936–37	XII	62	450	7 4	XII	89	896	6 6	VII	47	658	14 0	VII	54	1,620	30 0	VI	56	448	8 0	Not demand.			
1937–38	XI	29	189	6 8	XIII	89	890	6 3	VIII	57	926	16 4	VIII	56	1,232	22 0	VII	71	514	6 8	Do.			
1938–39	XIII	69	552	8 0	XIV	Not worked.			IX	35	280	8 0	IX	47	517	11 0	No demand.							

Statement of past and current prices of fuel coupes.

Year.	Dornal range. Megattur series. Coupe number.	Area worked.	Revenue.	Per acre.	Dornal range. Regatikunta series. Coupe number.	Area worked.	Revenue.	Per acre.	Giddalur range. Diguvametta series. Coupe number.	Area worked.	Revenue.	Per acre.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.
1928–29 ..	I	34	..	4 10	I	16	48	3 0	..	..	..	..
1929–30 ..	II	24	125	5 3	II	20	51	2 11	..	..	..	..
1930–31 ..	III	26	104	4 0	III	19	51	2 11	I	65	179	2 12
1931–32 ..	No demand.				No demand.				II	43	86	2 0
1932–33 ..	Do.				IV	13	30	2 5	III	116	181	1 9
1933–34 ..	IV	24	36	1 8	No demand.				IV	35	124	3 9
1934–35 ..	No demand.				Do.				No demand.			
1935–36 ..	Do.				Do.				Do.			
1936–37 ..	Do.				Do.				Do.			
1937–38 ..	Do.				Do.				V	76	152	2 0

Year.	Giddalur range—*cont.* Kothakota series. Coupe number.	Area worked.	Revenue.	Per acre.	Giddalur range—*cont.* Boggalasorawa series. Coupe number.	Area worked.	Revenue.	Per acre.	Turimella range. Somidevipalli series. Coupe number.	Area worked.	Revenue.	Per acre.
	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.
1928–29 ..	..	..	..	..	I	10	110	11 0	XI	42	147	3 8
1929–30 ..	..	..	..	..	II	12	276	23 0	XII	54	106	3 10
1930–31 ..	No demand.				III	20	220	11 0	XIII part.	58	87	1 8
1931–32 ..	Do.				No demand.				No demand.			
1932–33 ..	I	90	81	0 15	Do.				Do.			
1933–34 ..	II	56	77	1 6	Do.				XIII part.	8	11	1 6
1934–35 ..	III	96	192	2 0	Do.				No demand.			
1935–36 ..	IV	76	133	1 12	Do.				Do.			
1936–37 ..	No demand.				Do.				Do.			
1937–38 ..	Do.				Do.				Do.			

Year.	Turimella range—*cont.* Tallapaya series. Coupe number.	Area worked.	Revenue.	Per acre.	Turimella range—*cont.* Tummalepenta series. Coupe number.	Area worked.	Revenue.	Per acre.	Turimella range—*cont.* Utla series. Coupe number.	Area worked.	Revenue.	Per acre.
	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)
		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.
1928–29 ..	I	11	50	4 8	V	43	255	6 0	No demand.			
1929–30 ..	II	14	54	3 14	VI	51	1,020	20 0	I	26	78	3 0
	II addition.	24	68	2 13	..	..	..	..	II	32	203	6 8
1930–31 ..	III	30	68	2 2	VII	56	504	9 0	III	36	216	6 0
1931–32 ..	No demand.				VIII	80	640	8 0	IV	38	190	5 0
1932–33 ..	IV	32·10	64	2 0	No demand.				V	30	140	4 8
1933–34 ..	No demand.				Do.				No demand.			
1934–35 ..	Do.				X	35	163	3 4	VII	35	143	3 4
1935–36 ..	Do.				No demand.				VI	27	99	3 12
1936–37 ..	Do.				IX	62	186	3 0	No demand.			
1937–38 ..	Do.				XI	70	231	3 0	VII	30	108	3 0

Year.	Turimella range—*cont.* Vemalakunta series. Coupe number.	Area worked.	Revenue.	Per acre.	Turimella range—*cont.* Gandalakonda series. Coupe number.	Area worked.	Revenue.	Per acre.
	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)
		ACS.	RS.	RS. A.		ACS.	RS.	RS. A.
1928–29 ..	No demand.				..	..	..	..
1929–30 ..	I	92	874	9 8	..	..	..	..
1930–31 ..	II	96	480	5 0	I	31	70	2 4
1931–32 ..	No demand.				II	30	86	2 14
1932–33 ..	III	73	365	5 0	III	25	136	3 8
1933–34 ..	No demand.				No demand.			
1934–35 ..	V	80	292	3 4	Do.			
1935–36 ..	No demand.				Do.			
1936–37 ..	IV	90	270	3 0	IV	45	90	2 0
1937–38 ..	VI	72	157	1 11	No demand.			

1930–31.

Name of series.	Coupe number.	Area worked.	Revenue.	Per acre leased.
(1)	(2)	(3)	(4)	(5)
		ACS.	RS.	RS. A.
Birenimulla	I	40 not worked ..	245	6 2
Lingamayakuruva	I	32	116	3 10
Uppukontipaya	I	36 not worked ..	90	2 8
Bollupalli	I	40 do. ..	100	2 8
Malamanikunta	I	40	160	4 0

N.B.—There was no demand for the coupes in the above series after 1930–31.

Statement showing the past and current prices of bamboo coupes.

	Dornal Range.											
	Chilakacherla series.				Chinnamantrala series.				Peddamantrala series.			
Year.	Coupe number.	Area.	Outturn number.	Revenue.	Coupe number.	Area.	Outturn number.	Revenue.	Coupe number.	Area.	Outturn number.	Revenue.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
		ACS.		RS.		ACS.		RS.		ACS.		RS.
1928–29 ..	I	1,331	34,068	(a) 2,455	I	5,531	51,648	(a)	I	3,386	66,671	(a)
1929–30 ..	II	3,674	50,873	(b) 1,950	II	6,272	51,720	(b)	II	4,480	123,982	(b)
1930–31 ..	III	11,430	Not worked.	(c) 2,150	III	3,584	282,253	(c)	III	9,088	91,046	(c)
1931–32 ..	I	1,331	30,660	(d) 1,175	I	5,531	163,782	(d	I	3,386	112,163	(d)
1932–33 ..	II	3,674	60,124	200	II	6,272	106,908	325	II	4,480	143,632	600
1933–34 ..	III	11,430	344	75	III	3,584	206,917	2,000	III	9,088	71,619	410
1934–35 ..	I	1,331	38,775	330	I	5,531	130,633	1,500	I	3,386	149,258	1,245
1935–36 ..	II	3,674	91,880	355	II	6,272	163,670	2,700	II	4,480	241,410	2,800
1936–37 ..	III	11,430	4,399	175	III	3,584	264,195	3,525	III	9,088	248,091	835
1937–38 ..	I	1,331	343,285	110	I	5,531	320,246	505	I	3,386	561,445	480
1938–39 ..	II	3,674	..	200	II	6,272	..	1,010	II	4,480	..	1,480

	Dornal range—*cont.*				Gundlakamma Range.							
	Peddachama series.				Tunnel series.				Malakondapenta series.			
Year.	Coupe number.	Area.	Outturn number.	Revenue.	Coupe number.	Area.	Outturn number.	Revenue.	Coupe number.	Area.	Outturn number.	Revenue.
(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
		ACS.		RS.		ACS.		RS.		ACS.		RS.
1928–29 ..	I	4,416	17,855	(a)	III	816	28,473	510	III	960	Not worked.	557
1929–30 ..	II	11,904	34,802	(b)	I	820	25,740	1,200	I	646	59,137	120
1930–31 ..	III	8,096	33,161	(c)	II	864	71,112	1,010	II	636	67,543	410
1931–32 ..	I	4,416	18,347	(d)	III	816	20,031	711	III	960	Not sold.	..
1932–33 ..	II	11,904	18,933	200	I	820	123,300	950	I	646	49,943	1,200
1933–34 ..	III	8,096	61,051	1,245	II	864	92,602	610	II	636	44,641	480
1934–35 ..	I	4,416	34,760	390	III	816	115,825	200	III	960	67,338	270
1935–36 ..	II	11,904	48	335	I	820	115,388	1,900	I	646	38,848	310
1936–37 ..	III	8,096	38,843	1,060	II	864	198,338	660	II	636	122,834	820
1937–38 ..	I	4,416	390,992	300	III	816	127,259	450	III	960	..	..
1938–39 ..	II	11,904	..	410	I	820	..	1,210	I	646	..	550

	Gundlakamma Range—*cont.*											
	Series No. 1.				Series No. 2.				Series No. 3.			
Year.	Coupe number.	Area.	Outturn number.	Revenue.	Coupe number.	Area.	Outturn number.	Revenue.	Coupe number.	Area.	Outturn number.	Revenue.
(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)
		ACS.		RS.		ACS.		RS.		ACS.		RS.
1928–29 ..	..	..	..	..	..	..	..	..	..	..	..	..
1929–30 ..	..	..	..	..	..	..	..	..	..	..	..	..
1930–31 ..	I	..	139,842	125	I	..	53,716	140	I } II }	..	29,220	{ 65 115
1931–32 ..	II	..	Not sold.	..	II	Not sold.	..	..	III	..	Not sold.	..
1932–33 ..	III	..	29,774	145	II	..	57,453	90	III	..	14,075	190
1933–34 ..	I	..	13,204	145	I	..	24,090	65	I	..	45,273	115
1934–35 ..	II	..	42,927	84	II	..	..	104	II	..	..	62
1935–36 ..	III	..	48,721	(e) 1,060	III	..	26,809	(e)	III	..	73,364	(e)
1936–37 ..	I	..	50,523	(f) 500	I	Not worked.	..	(f)	I	Not worked.	..	(f)
1937–38 ..	II	..	63,512	(g) 610	II	(g)	..	(g)	II	..	(g)	(g)
1938–39 ..	III	3,280	..	(h) 900	III	2,080	..	(h)	III	4,260	..	(h)

	Giddalore Range.												Ganjivaripalli Range—Nekkanti series.	
	Bodi series.				Othumadugu series.				Guvvalapenta series.					
Year.	Coupe number.	Area.	Outturn number.	Revenue.	Coupe number.	Area.	Outturn number.	Revenue.	Coupe number.	Area.	Outturn number.	Revenue.	Coupe number.	Area.
(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)
		ACS.		RS.		ACS.		RS.		ACS.		RS.		ACS
1928–29 ..	..	..	..	..	..	..	..	..	..	..	..	..	I	7,500
1929–30 ..	..	..	..	..	..	..	..	..	..	..	..	..	II	8,000
1930–31 ..	I	..	30,762	240	I	..	31,380	520	I	..	82,315	1,080	III	7,500
1931–32 ..	II	..	67,201	305	II		No demand.	..	II	..	57,191	1,080	I	7,500
1932–33 ..	III	..	38,039	250	III	..	52,986	1,525	III	..	216,363	2,175	II	8,000
1933–34 ..	I	..	1,17,396	415	I	..	6,124	250	I	..	118,486	1,000	III	7,500
1934–35 ..	II	..	36,596	385	II		Not sold.	..	II	..	97,712	1,450	I	7,500
1935–36 ..	III	..	49,931	400	III	..	5,148	810	III	..	115,201	1,005	II	8,000
1936–37 ..	I	..	1,00,828	1,130	I		Not sold.	..	I	..	136,829	600	III	7,500
1937–38 ..	II	..	71,475	350	II	..	25,276	185	II	..	104,490	1,130	I	7,500
1938–39 ..	III	8,170	..	150	III	3,470	..	800	III	1,330	..	980	..	..

	Ganjivaripalli Range—Nekkanti series—*cont.*		Turimella Range.								Markapur Range—Markapur series.			
			Maddipenta series.				Turimella plains series.							
Year.	Out-turn. number.	Net rev-enue.	Coupe num-ber.	Area.	Out-turn number.	Rev-enue.	Coupe num-ber.	Area.	Out-turn number.	Rev-enue.	Coupe num-ber.	Area.	Out-turn number.	Rev-enue.
(55)	(56)	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)	(67)	(68)	(69)
		RS.		ACS.		RS.		ACS.		RS.		ACS.		RS.
1928–29 ..	10,599	46	I	..	98,625	1,300	I	..	15,775	115	I	4,454	4,630	50
1929–30 ..	20,950	64	II	..	111,419	1,850	II	..	5,350	500	II	9,728	372	30
1930–31 ..	10,840	28	III	..	37,383	1,000	III		Not worked.	50	III	21,018	Not leased out.	
1931–32 ..	24,500	97	I	..	Not worked.	380	I	..	73,400	65	I	4,454	Do.	
1932–33 ..	23,120	62	II	..	47,990	651	II	..	8,380	82	II	9,728	Do.	
1933–34 ..	31,238	113	III	..	77,120	813	III	..	138,443	45	III	21,018	Do.	
1934–35 ..	65,711	244	I	..	48,762	380	I	..	30,955	170	I	4,454	Do.	
1935–36 ..	41,963	147	II	..	85,206	1,025	II	..	46,397	235	II	9,728	Do.	
1936–37 ..	41,420	130	III	..	121,788	821	III	..	60,735	58	III	21,018	2,240	11
1937–38 ..	22,560	74	I	..	90,789	470	I	..	12,146	280	I	4,454	Not leased out.	
1938–39 ..	..	..	II	3,610	..	1,270	II	19,584	..	160	..	..	..	..

(a) The four coupes were jointly leased out for Rs. 2,455 during 1928–29.
(b) Do. Rs. 1,950 do. 1929–30.
(c) Do. Rs. 2,150 do. 1930–31.
(d) Do. Rs. 1,175 do. 1931–32.
(e) The three coupes were leased out jointly for Rs. 1,060 in 1935–36.
(f) Do. Rs. 500 in 1936–37 }
(g) Do. Rs. 610 in 1937–38 } yield given jointly
(h) Do. Rs. 900 in 1938–39 }

112. *Selling rates at depot.*—The following statement shows the current sale prices at the contractor's depot at Diguvametta.

Details. (1)	Species. (2)	Size. (3)	Rate. (4) RS. A. P.	Per (5)
Timber, log	Teak	I class 3′ 6″ to 6′ girth.	1 12 0	C.ft.
	Teak	Other classes	1 8 0	C.ft.
	Terminalia tomentosa.	Beams and posts.	1 4 0	C.ft.
	Pterocarpus marsupium	Do.	1 4 0	C.ft.
	Rosewood	Do.	1 0 0	C.ft.
	Givotia rottleriformis	..	0 6 0	C.ft.
	Sterculia urens	..	0 5 0	C.ft.
	Adina cordifolia	..	1 2 0	C.ft.
	Stephegyne parvifolia.	..	1 2 0	C.ft.
	Bassia latifolia	..	0 10 0	C.ft.
	Anogeissus latifolia	3′ girth and above.	0 10 0	C.ft.
Pillars, I class	*Terminalia tomentosa.* / *Anogeissus latifolia*	$10\frac{1}{2}' \times 2'$ / $10\frac{1}{2}' \times 2'$	100 0 0	100
Pillars, II class	Do.	$10\frac{1}{2}' \times 1\frac{1}{2}'$	75 0 0	100
Rafters, I class	Do. / *Terminalia tomentosa*	$7\frac{1}{2}' \times 1'$	50 0 0	100
Rafters, II class	Do.	$7\frac{1}{2}' \times 1'$	30 0 0	100
Rafters, III class	Do.	$7\frac{1}{2}' \times 1'$	20 0 0	100
Spokes and felloes	*Pterocarpus marsupium.*	12 felloes 24 spokes	22 0 0 to 24 0 0	Set.
	Teak	do.	22 0 0 to 25 0 0	Set.
	Rosewood	do.	20 0 0	Set.

CHAPTER IV.—STAFF AND LABOUR SUPPLY.

SECTION 1.—STAFF.

113. *Staff.*—The strength of the present establishment of the division is shown in the following statement :—

Description. (1)	Staff. (2)	Strength. Sanctioned. (3)	Existing. (4)	Remarks. (5)
Administrative	District Forest officer	1	1	The present incumbent is a Deputy Conservator.
Executive	Range officers	6	6	..
Protective	Foresters	20	16	I grade .. 1
				II grade .. 2
				III grade .. 6
				IV grade .. 6
				V grade .. 5
	Forest guards	54	54	I grade .. 4
				II grade .. 6
				III grade .. 18
				IV grade .. 26
District Forest office establishment.	Head Clerk	1	1	
	Accountant	1	1	
	Routine clerks	4	4	
	Typist	1	1	
	Draughtsman	1	1	
	Menials (peons)	4	4	
Range office establishment	Range clerks	7	7	Two clerks for Dornal Range office.
	Range menials	6	6	
Temporary establishment	Reserve watchers	53	53	
	Bungalow watchers	5	5	
	District Forest office watcher.	1	1	
	Range office watchers	3	3	For Giddalore, Ganjivaripalli and Markapur ranges.
	Tappal watchers	3	3	For Ganjivaripalli, Turimella and Markapur ranges.
	Punkahpuller	1	1	For four months in the year.

SECTION 2.—LABOUR.

114. *Chenchu labour.*—The large number of Chenchu gudems within the reserved forests of the division and the numerous villages bordering on or in close proximity to the reserves in the plains provide an enormous amount of unskilled labour which is more than ample to meet the requirements of the management. In fact the provision of sufficient work for the Chenchu population within the reserves has been and continues to be an anxious problem. A stipulation is invariably made in all agreements relating to forest leases and to works given on contract, that the contractor should employ Chenchu labour, and, if for any reason, the employment of plainsmen is found necessary he should obtain the previous sanction of the District Forest Officer. Works such as collection of minor forest products, bamboo exploitation, timber and fuel operations are invariably executed by Chenchu labour.

115. *Lack of labour in Iskagundam.*—No Chenchu gudems exist in the ranges of Giddalur and Gundlakamma, though a few Chenchus have recently settled down at Iskagundam in Gundlakamma range. Labour difficulty is experienced in Gundlakamma range for exploitation of forest produce and for constructional works. The position with regard to labour in the hill portions of Giddalur range is not favourable. In both these ranges plains labour have to be requisitioned at enhanced rates ; but during the fever season the coolies are reluctant to stay on the hills. The possibilities of popularizing the Chenchu settlement at Iskagundam and expanding it should be considered.

116. *Amount of labour available.*—The following statement shows the amount of labour available at each of the Chenchu gudems in the division :—

Serial number and name of the gudem.	Adults.			Remarks.
	Males.	Females.	Total.	
(1)	(2)	(3)	(4)	(5)
Dornal Range.				
1 Marripalam	35	42	77	
2 Chintala	19	19	38	
3 Peddachama	38	40	78	
4 Tummalabailu	21	15	36	
5 Chinnamantrala	25	24	49	
6 (Kanduka) Peddamantrala	48	56	104	
7 Chilakacherla	68	50	118	In the unreserve.
Gundlakamma Range.				
8 Iskagundam Chenchu gudem (not recognized).	13	8	21	
Giddalur Range.				
No gudem.				
Ganjivaripalli Range.				
9 Telugurayanicheruvu	25	23	48	
10 Nekkanti	13	13	26	
11 Palutla	39	35	74	There are Lambadis also in these gudems.
12 Guttalachenu	19	23	42	
13 Pannalabailu	15	13	28	
14 Madapa chelime	18	18	36	
15 Suddakunta	12	10	22	
16 Allipalam	27	26	53	
17 Daddanala	11	8	19	There are Lambadis also in this gudem.
Turimella Range.				
18 Maddipenta	32	28	60	Since shifted to Bimarayanicheruvu.
Markapur Range.				
19 Chintalamudipi	30	30	60	

117. *Labour for road and constructional works.*—Road works are usually given on contract to Woddars. Chenchu labour is employed only on rare occasions for this purpose. Labour for constructional works has invariably to be imported.

CHAPTER V.—PAST SYSTEMS OF MANAGEMENT AND THEIR RESULTS.

SECTION 1.—GENERAL HISTORY OF THE FOREST.

118. *Political history.*—The early political history of Kurnool is shrouded in obscurity. The Nandana dynasty ruled over the country about the tenth century and was followed by the Chaulakyas, during whose regime Jains made great progress. The Chaulakyas were eventually followed by the Chola kings, and in the beginning of the thirteenth century the Andhra kings extended their conquest up to Nellore. A powerful chieftain, Anavemma Reddi, ruled over the tracts included in the division from 1361 to 1460. He was invaded by the kings of Orissa, the Gajapathis, who expelled the local chieftain and appointed one Gopanna Udaiyar as the Governor of Cumbum. He built the Cumbum tank. At the time, the other parts of Kurnool on the west were ruled by the Vijayanagar Kingdom, when learning was greatly patronized. During 1674 Sivaji, the famous Mahratta leader, visited Kurnool on his way to Srisailam. The country was under the Moghul Empire during the seventeenth century. In 1741 the country was overrun by an army of Mahrattas, who plundered it. In 1775, Hyder invaded Kurnool. In 1799, after the fall of Seringapatam, when the Mysore territories were divided between the Nizam and the English, Kurnool and other districts fell to the share of the Nizam. In 1800, the Nizam ceded Kurnool, along with other districts called the Ceded districts, to the English in lieu of payment of subsidy to troops maintained by them at Hyderabad. Cumbum and Markapur, which were then taluks of Cuddapah, were taken charge of by Munroe. Commissioners were appointed from 1839, and in 1858, the Collectorate of Kurnool was constituted.

119. *Revenue history.*—During the time of the Chola dynasty Nandyal taluk was constituted and a system of land measurement was introduced. Great impetus was given to cultivation in the 14th century by the Andhra kings and plenty of inam lands

were bestowed. During the Vijianagar period the country was parcelled out into jaghirs, and extensive alienations of revenue were made in favour of Brahmans and religious institutions. During the Hindu and Muslim periods the village lease system appears to have been the mode of settlement. When the English took charge of the administration land assessment was very heavy with the result that extensive tracts of Government land were left uncultivated and Markapur remained very poor. Munroe commenced a reduction of assessment, which was followed by substantial reductions at subsequent settlements.

120. *Early forest history.*—During the time of the Chaulakyas in the eleventh century it is recorded that the country was entirely covered with jungle. Till the fourteenth century the taluks of Markapur and Cumbum were covered with jungle when the Andhra kings gave an impetus to cultivation by making large clearances of jungle. The tank at Markapur was built by Telugurayudu, an officer of Gajapathi, on the occasion of his pilgrimage to Srisailam and, probably, the Telugurayanicheruvu was also built at about the same time as it bears the name of that officer. The anicut across Ralla vagu, which feeds the Yerragondapalem tank was built by the Dornal Zamindar. The existence of ruins of fortifications, abandoned cultivation inside reserved forests, distinct avenues of tamarind and banyan, old pagodas nearly 500 to 600 years old, and numerous tanks and wells in ruins bear testimony to the belief that the country was populous and prosperous during the fourteenth century. Moreover, the route from Markapur, Yerragondapalem, Ganjivaripalli, Telugurayanicheruvu and Chinna Arutala, appears to have been the oldest and most used pilgrim route from the east to the Srisailam temple. Consequent on expansion of cultivation accompanied by increase in population during the fourteenth century large clearings were made in and adjoining villages and towns. Depopulation soon followed due to famine and pestilence with the result that extensive abandoned holdings reverted to jungle. In 1862, the Forest Conservancy department took over the control of the forests in Kurnool district. The following is a record of the system prevailing at the time. "In the northern parts, where the jungle is poor, there are extensive grassy level lands, which afford pasture to the numerous heads of cattle that resort to them from Nellore and Kistna districts, and in seasons of scarcity they form the most valuable source of food supply to the cattle in the plains. The grazing lands are annually leased for Rs. 700 or Rs. 800 to a renter who levies a fee of annas two on each head."

Administrative History.

121. *Jungle Conservancy and the Forest Departments.*—From 1862, the administration of the forests was under the charge of the Jungle Conservancy Department, who concentrated on raising several topes of mangoes, tamarind and neem in the plains tracts. The Forest Act was passed in 1882, and in 1883, the reservation of the Nallamalai forests was commenced. At the time of reservation of these forests, Mr. Sim, officer in charge, cut 30 feet cleared straight lines through the forests so as to include a certain tract of forest within the 30 feet line and the assessed lands in the plains, so that certain privileges might be exercised by the ryots in this tract. Forest Settlement was taken up in 1886, when the forests were put under the management of the Forest Department. In 1890, proposals to reserve the terai forests at the foot of the Nallamalais were made and between the years 1890 and 1904 the eastern Nallamalai blocks were constituted and added on to the main reserve.

122. *Formation of divisions.*—Till 1904, the whole of the Kurnool forests was administered by one District Forest Officer, when they were divided into two charges, Kurnool East and Kurnool West, in G.O. No. 285, Revenue, dated 11th March 1904. The headquarters of the division which was originally at Kurnool was changed to Nandyal in 1887–88 and was retransferred to Kurnool in 1891–92. In 1910, a third division, Kurnool South, was constituted under G.O. No. 3684, Revenue, dated 21st November 1910, thereby causing changes in the other two divisions. Kurnool West is the oldest and is the original division.

123. *Transfer to panchayat.*—Government in their Order No. 3020, dated 13th October 1913, approved of the recommendation of the Horne Committee, which was constituted for the purpose of enquiring into and suggesting remedies for certain grievances of the local population, to classify the forests of the Presidency into six classes and that class V forest, viz., grazing grounds, should be handed over to panchayat management. Accordingly the reserves of Ganapavaram and Yerragondapalem, which are now in Yerragondapalem range transferred to Guntur division, were handed over to panchayat management in 1917.

Again in 1928 in pursuance of the policy of Government to hand over all class III, unremunerative and communal forests to the management of local panchayats, several of the Eastern Nallamalais blocks and Giddalur blocks Nos. 1 and 2 were handed over to panchayat management in 1928 but they soon reverted to departmental control due to

the difficulties in the management of grazing especially in reserves contiguous with the main reserves, and partly due to the apathy on the part of the villagers to undertake the responsibilities designed to serve communal interests.

124. *Sanction of a fourth division.*—In 1919, on the representation of the territorial officers that there was work for more than three officers in the Kurnool forests, Government in their Order No. 1642, Revenue (Special), dated 28th August 1919, sanctioned the formation of a fourth division but the order was not given effect to due to shortage of officers at the time. Subsequent representations from the territorial officers for the formation of the fourth division failed to find favour with the head of the department.

125. *Change of administration of the department.*—The administration of the department was changed from the Board of Revenue to the Chief Conservator of Forests in 1920.

126. *Changes in ranges.*—The Kurnool East division comprised the following ranges :—Cumbum, Markapur, Gudem, Moricheruvu, Dornal and Rachakonda till 1925 when the ranges were reallocated and named as follows : Dornal, Ganjivaripalli, Yerragondapalem, Markapur and Turimella in G.O. No. 1021, Development, dated 11th November 1925.

127. *Transfer of Kanigiri Range.*—In 1930, Kanigiri range of Nellore division was transferred to Kurnool South, consequent on the transfer of a large number of reserves in that range to panchayat management, leaving only three reserves which adjoin Kurnool district and which, at the time, were considered more easy of administration by the Kurnool Forest Officer. As the area of reserves left in Kanigiri range after handing over some to panchayat was too small for a range charge, a part of the Veligondas from Giddalur range of Kurnool South was added on to Kanigiri to make it a reasonable charge.

128. *Transfer of portion of ranges.*—A portion of the old Gundlakamma range consisting of 4,938 acres was transferred to Turimella range in G.O. Ms. No. 1962, Development, dated 11th November 1929 (C.C.P. Mis. No. 442, dated 19th November 1929). The old Chelama range now in Kurnool West included a portion of the present Gundlakamma range between Diguvametta and Malakondapenta, and this portion was transferred to the present Gundlakamma range in Conservator's R.C.M.S. No. 1450, dated 11th October 1926.

129. *Reallocation of divisions.*—Consequent on the abolition of Kurnool South division in 1939, by Government, as a measure of retrenchment and economy, the Chief Conservator of Forests in his Proceedings No. 6249/38-C-2, dated 3rd March 1939 ordered the transfer of Yerragondapalem range to Guntur division, the abolition of Kanigiri range and the transfer of the three reserves falling within Kanigiri taluk to the Udayagiri range of Nellore division and the addition of the balance of Kanigiri range to Giddalur range thus reviving the old Giddalur range, and the addition of Giddalur, Gundlakamma and Turimella ranges from Kurnool South, which is now abolished, to the new Kurnool East division. The orders were given effect to in March 1939. The present Kurnool East division comprises the following ranges :—

Dornal, Ganjivaripalli, Gundlakamma, Giddalur, Markapur and Turimella.

130. *History of the Chenchus.*—Thurston in his book on " Castes and tribes of South India " has described the Chenchus in the following terms in 1694 :—" They molest no one but live in caverns and under shady branches of trees, that upon the firing of a gun they dart up the hill with a surprising swiftness uncommon to man."

131. *Habits.*—Like most hill tribes of an aboriginal character, the Chenchus were wild in their nature, living in the interior jungles of the Nallamalais on the roots of forest shrubs and climbers, on minor forest products and forest game. Early in the nineteenth century, the liberties of the Chenchus, who were till then monarchs of the forest areas, were curtailed by extension of cultivation. With the introduction of forest conservancy in 1860 their liberties were still further curtailed with the result they resorted to malicious thieving and wilful firing of the jungles.

132. *Reclamation.*—As early as 1860 the question of reclaiming the Chenchus from vagabondism to agricultural pursuits was recommended but the recommendation failed to find favour with the authorities concerned. Consequent on the reservation of forest areas under the Forest Act the liberties of the Chenchus were still further limited. In 1883-84, proposals were made for the employment of Chenchus on departmental works. The right of pre-emption vested with the Government in the matter of the rights allowed to the Chenchus at the time of settlement in regard to minor forest products, was exercised by Government, so as to prevent the money-lender from getting direct access to the Chenchus. Departmental collection of minor forest produce with Chenchu labour was undertaken with a view to relieving the Chenchus from the clutches of the Sowcars to whom they were heavily indebted. This measure failed to find favour with the Chenchus who preferred direct sale to the Sowcars, as they advanced them large amounts, which were repaid not only by collection of minor forest products but also by the supply of illicitly removed timber from the forests. Chenchu crime, particularly

incendiarism and assault on subordinates were on the increase. In 1897–98, departmental collection of minor forest products was abandoned, and the Chenchus were given the produce free on condition of good behaviour. In 1902–03, fire protection was entrusted to the Chenchus and liberal rewards were promised. In the same year lands were granted near Garapenta in Yerragondapalem range for cultivation on condition that the forests were protected from fire. But this policy of indulgence proved again a failure. The following extract from a publication of 1896 on the condition of the Chenchus is so illuminating that it is reproduced :—

> "It is commonly supposed that they are semi-wild, innocent, inoffensive hill tribe living on roots, honey, wild fruits and game. If this were so we should have no difficulty in controlling them. They are actually a semi-wild, lazy, thieving, drinking set of brigands. They levy blackmail from every village along the foot of the hills . . . and from every pilgrim to the shrines in the hills. They borrow money from the Komatties and repay it in kind—stolen timber, minor forest products, etc. . . . They think nothing of felling a tree in order to collect its fruits and they fire miles of forest in order to be able to collect with ease certain minor forest produce or to trace game. They poison the streams throughout the hills, and in short do exactly as they please throughout the length and breadth of the Nallamalais."

133. *Special proposal.*—The period 1905–1914 is noteworthy in the history of Chenchu administration as large scale plantation works were undertaken at considerable cost, despite their disappointing results as plantations, solely with a view to providing congenial work for the Chenchus and thereby keeping them out of mischief. Due to the cessation of plantation work in 1914, Chenchu crime began to increase and on representations made by the villagers to the Collector of Kurnool an enquiry was undertaken by Mr. Hood, whose recommendation consisted in the appointment of a special officer to look after the Chenchus, particularly to arrange for the education of the children and to provide sufficient work for the Chenchus. Towards this end Mr. Saunders was appointed as special officer in charge of the Chenchus for a period of two years from 1917. Thereafter, the District Forest Officer, Kurnool West, was the Special Chenchu Officer, and an Assistant Chenchu Officer, a Chenchu Sub-Assistant Surgeon and an Education Superintendent were appointed under him.

134. *Chenchu schools.*—In 1916, schools were started in important Chenchu gudems for imparting elementary education on modern lines to Chenchu boys and girls in the hope of enlisting the co-operation and loyalty of the younger generation, when they grew up. At the same time, adult Chenchus were instructed in the art of splitting bamboos by getting an expert from Bairluty.

135. *Felling of emergency coupes.*—Consequent on the outbreak of Chenchu crime in 1919, the felling of emergency coupes in the vicinity of important Chenchu gudems was undertaken between the years 1919 and 1925. The fellings were, however, stopped in 1925 as they were found unremunerative and were considered destructive.

136. *Moir's report.*—On the recommendations of Mr. T. E. Moir, who conducted an enquiry into the matter of Chenchu reclamation, Government, in their Development Department Proceedings No. 1634, dated 6th December 1922, laid down the following policy :—

(*a*) that continued efforts should be made in popularizing the Chenchu schools,

(*b*) that until more settled habits are developed among the Chenchus, the Forest department should take up the responsibility or providing the Chenchus with regular and suitable employment even at a loss, if necessary, to the department, and

(*c*) that they should be kept under proper control.

In the same proceedings of Government, the Collector of Kurnool was made Special Chenchu Officer and each District Forest Officer, Chenchu Officer for his division. It was also ordered that the Chenchu budget should be borne on the Forest budget. Control measures were instituted by bringing the Chenchus under the Criminal Tribes Act, providing certain Forest Guards with guns, investing the Assistant Chenchu Officer with magisterial powers, etc.

From 1926–27 increased exploitation of bamboos was done as contract enterprise replaced departmental working, and the earnings of the Chenchus consequently increased. In respect of persuading the Chenchus to take to agriculture nothing was done beyond the grant of advances for the purchase of agricultural bulls.

137. *Measures in Mr. Sarma's plan.*—In the working plan by Mr. A. N. Anantanarayana Sarma for Kurnool East it was provided that, as adequate forest work could not be found for the Chenchus, they should be persuaded to settle down to agriculture on a vigorous programme. It was also pointed out that the Chenchus were exceeding the rights and concessions admitted in their favour in respect of grazing and occupancy, and that the matter should be set right.

138. *Mr. Sundaram's report.*—A special officer was appointed in 1932 to enquire into all the circumstances relating to Chenchu rights of occupancy and grazing, and to suggest measures for regularizing departures from admitted rights. The special officer's recommendations were as follows :—

(*a*) In cases of abandoned gudems, which were admitted at the time of settlement, to treat them as reserves under the pre-emptive rights of Government.

(*b*) To demarcate and set apart for the Chenchus areas proposed by the officer as gudem enclosures and grant such areas on annual leases.

(*c*) To take steps to reduce the number of goats to the number admitted at settlement in respect of seven gudems in the whole district. The total number of goats involved was only 736.

The Chief Conservator of Forests in his Proceedings No. 321, Press, dated 15th July 1932, ordered as follows :—

(1) Abandoned gudems should be registered in the prohibitory registers maintained by the Revenue department as not available for assignment, so as to ensure that gudem sites are not assigned to ryots.

(2) Occupation of unadmitted settlements should be regularized by the grant of rent-free annual leases by the Forest department.

(3) In the case of expansion of cultivation around existing gudems, the occupation of such areas in excess of that admitted at settlement, may be regularized by the grant of rent-free annual leases.

(4) Increase of cattle need not be discouraged as it will be in the interests of agriculture.

(5) To insist on the reduction in the number of goats to the number prescribed at settlement within a period of three years.

139. A statement showing the rights to grazing admitted at the time of settlement and those enjoyed at present by the Chenchus is given below :—

Serial number and name of gudem as at present existing.	Name of gudem as it was at settlement.	Free grazing allowed at settlement.		Now enjoyed.			
				Cattle.			
		Cattle.	Goats or sheep.	Cows and bulls.	Buffaloes.	Goats.	Sheep.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Dornal Range.					
1 Maripalem	Maripalem ..	..	50	169	77	246	..
2 Chintala	Chinnachama and Chintala.	20	50	..	10	48	..
3 Peddachama	Peddachama ..	..	50	187	87	88	..
4 Thummalabailu	Thummalabailu and Pecheruvu.	Included in Pecheruvu, Kurnool West.	..	32	28	..	..
5 Chinnamantrala	Kurapenta, Chinnamantralamma.	..	50	..	32	28	..
6 Kandaka (Branch of Peddamantrala).	Irukudupalli ..	..	100	25	..	5	..
7 Peddamantrala	Mantralamma ..	..	..	204	104	188	..
8 Chilakacherla	Chilakacherla and Nuthibhatti.	60	300	48	64	383	* 4
9 Nallagunta	Nallagunta ..	..	100	..	..	77	* ..
10 Panukumadugu	Panukumadugu	10	100	..	8	26	* ..
		Gundlakamma Range.					
1 Iskagundam	New (Not recognised).						
		Giddalur Range—No gudem.					
		Gangivaripalli Range.					
1 Telugurayanicheruvu ..	Telugurayanicheruvu.	50	100	140	63	51	..
2 Nekkanti	Nekkanti ..	250	250	..	..	41	..
3 Palutla	Alutla	Included in Nekkanti.	..	15	36	238	..
4 Guttalachenu	Guttalachenu ..	150	150	5	6	97	..
5 Pannalabailu	Bandirayanicheruvu.	..	..	..	11	66	..
6 Madapachelima	Mademchelima ..	40	200	10	19	64	..
7 Suddakunta	Suddakunta ..	10	100	3	23	70	..
8 Allipalem	Allipalem ..	Included in Medamchelima.	..	20	72	111	..
9 Daddanala	Daddanala ..	10	50	10	37	34	..
		Turimella Range.					
1 Maddipenta	Pogapadu ..	..	..	..	16	..	..
		Markapur Range.					
1 Chintalamudupi	New	..	..	..	18	202	* 35

* Gudem is situated in the unreserve.

SECTION 2.—PAST SYSTEMS OF MANAGEMENT AND THEIR RESULTS.

Position with regard to working plans.

140. *Barlowe Poole's plan.*—The first attempt at the preparation of a working plan for Giddalur range was made by Mr. Barlowe Poole in 1912 but the plan was not sanctioned. In 1914, a preliminary working plan was prepared by Mr. Thompson according to which certain areas were to be set apart for grazing purposes, and a number of gradiented lines traversing the hills and valleys were to be cut. This plan was sanctioned tentatively for three years in, B.P. No. 79, Land Revenue (Forest), dated 10th April 1914.

141. *Mr. Madan's plan.*—The Board of Revenue in their Proceedings Mis. No. 111, dated 9th March 1916 sanctioned a working plan for the Gudem range by Mr. Madan. The main features of the working plan consisted in laying out a definite programme of administration to ensure continuity of policy in regard to fire protection, construction of paths, roads and sheds, bunding up head waters and streams, sowing sandal and other evergreen species, filling up casualties in plantations, etc. Grazing was to be rigidly excluded and bamboos were to be cut back with the object of exterminating them from certain localities so as to clear the ground for the growth and development of superior timber species. The plan was sanctioned tentatively for a period of five years. The plan contemplated the systematic classification of forests into distinct types and the collection of necessary data for a more comprehensive plan, but in the absence of definite prescriptions the matter was lost sight of.

142. *Emergency coupes.*—On the expiry of Mr. Madan's plan, and due to the sudden outbreak of Chenchu crime in 1919 it became imperative on the part of the management to provide work for the Chenchus in the vicinity of their gudems. Towards this end the clearfelling of the so-called " emergency coupes " was undertaken in areas adjoining each gudem.

143. *Mr. Sarma's plan.*—The working plan by Mr. A. N. Ananthanarayana Sarma for the entire Kurnool East division, as it was then constituted, was sanctioned in Chief Conservator's Proceedings No. 230, dated 4th July 1929, for a period of ten years from 1928. The plan expired on 31st March 1938. The old plan was however followed till the end of March 1939, when the revised working plan for Kurnool East by the author was sanctioned tentatively for one year from 1st April 1939 pending the rewriting of the working plan for the New Kurnool East consequent on the abolition of Kurnool South and the transfer of Yerragondapalem range to Guntur.

144. *Mr. Sundaram's scheme.*—In 1925–26 a tentative scheme for three years for the Giddalur and Gundlakamma ranges was prepared by Mr. A. V. Sundaram and the provisions of this scheme were adopted in practice though the scheme itself was not sanctioned.

145. *Mr. Sundaram's plan.*—The first regular working plan for Giddalur and Gundlakamma ranges by Mr. A. V. Sundaram was sanctioned in Chief Conservator's Proceedings No. 306, Press, dated 4th June 1930, for a period of ten years from the 1st of April 1930, and the plan is in force now.

146. *Chelama working plan.*—That portion of Gundlakamma range, which was originally in Chelama range and thereafter was transferred to Gundlakamma, was included in the working plan for Chelama range prepared by Mr. Sundaram and sanctioned in Chief Conservator's Proceedings No. 106, Press, dated 25th May 1926. The plan expired in 1936, but the old prescriptions are being continued.

147. *History of past management.*—The activities of the division consist in the exploitation of timber, fuel, bamboo, minor forest produce and grazing. Past history of exploitation of these products has been dealt with below separately for each item.

Timber.

148. *Licence and voucher system.*—The early history of the management of these forests reveals one of wasteful exploitation at ridiculously low rates under the " Licence and Voucher " system. A seigniorage fee of Rs. 2 per cartload of timber, consisting of 16 poles above 6 inches in diameter, was charged, while removals in headloads were admitted free, which resulted in evasion of payment and the sacrifice of superior timber species to immediate individual profit. In 1862, Beddome proposed systematic conservancy of the forests and raising the seigniorage fee to Rs. 3 per cartload, and suspension of teak felling. It has been recorded that a regular cordon of thieves existed round the Nallamalais, who, during certain seasons, devoted themselves to exploiting the forests, paying when they were obliged to, and stealing when they could. So great was this traffic in timber that the people neglected agriculture.

149. *Permit system.*—In 1887, on the advice of Gamble, the system of levying seigniorage on cartloads was changed into one of sale on permits for individual trees. Rules for felling were prescribed but the important suggestion made by Gamble that annual exploitation areas should be marked beforehand was ignored.

150. *Dead wood removal.*—Even in 1904 illicit removals were effected on a large scale and in 1905, the ' permit system ' was stopped by Mr. Rama Rao. Since reservation, and until 1905–06, unrestricted permit system was in vogue, as a result of which considerable damage was done to the forest as may be seen from the fact that a quantity of 31,900 cubic feet of dead timber and fuel was collected departmentally from the Giddalur Nallamalais between the years 1906 and 1914. Except for the removal of dead timber, the reserves were given comparative rest from 1906. Between the years 1909 and 1914 the dead and decaying wood and the materials got from the clearing of the fire lines in Gundlakamma range were collected and sold in depots at Iskagundam and Malakondapenta, at fixed rates ranging from 8 annas to Re. 1 per cubic foot for timber of better species, and 4 annas to 8 annas per cubic foot for inferior species. From 1914, when the timber of better quality was exhausted, inferior timber was collected and sold in auction till 1916, when selection fellings of trees over 4½ feet in girth were commenced. This system was stopped as no contractors were available to work in the unhealthy tracts of the Nallamalais, and as it was found that the forests were gradually deteriorating by the disappearance of the best shelter trees. Departmental fellings were begun in 1918 under the ' improvement felling ' system. All trees that had no future before them, and such of the unsound trees as interfered with the growth of better trees, were marked and felled.

151. *Experimental clearfelling.*—In 1921–22, Mr. Jackson introduced as an experimental measure the system of clearfelling, burning the refuse and regenerating by artificial means. Two coupes were worked under this system on the Iskagundam plateau in 1922–23 and 1923–24 respectively. The system was given up under the orders of the Chief Conservator of Forests as the cost of regeneration was not commensurate with the results obtained.

152. *Selection felling.*—In 1924–25, good and sound timber trees of and above 4 feet in girth were marked for felling and 31,000 cubic feet of logs were thus extracted of which 17,000 cubic feet were sold at Diguvametta during that year. One hundred and fifty-five sets of spokes and felloes were also converted and sold. Fellings were undertaken under no definite specifications or prescriptions and consisted in the removal of almost all sound trees and also a number of unsound ones.

153. *Mr. Raju Naicker's scheme.*—A tentative working scheme was prepared by Mr. Raju Naicker for the timber areas on the Iskagundam plateau in 1926, but it was not sanctioned as the proposals were found to be based on inaccurate data. Timber coupes were however worked under the provisions of this scheme, with modifications as regards the intensity of felling. Between the years 1918 and 1929 a total quantity of 92,191 cubic feet of timber was exploited from the Iskagundam plateau forests.

154. *Raising teak plantations.*—On the other hand in the forests of old Kurnool East no exploitation of timber on any systematic scale was undertaken. Proposals were made in 1905 for planting up large areas in the vicinity of Chinnamantrala, Peddamantrala, Peddachama, Maddipenta and Telugurayanicheruvu with teak, as a measure of providing work for the Chenchus and, incidentally, for the improvement of the forest itself on the hill slopes, and for ensuring water-supply to the plains. An area of about 327·25 acres was dealt with at the exorbitant cost of Rs. 64,640 between the years 1905 and 1914 and the entire undertaking proved a dismal failure.

155. *Emergency coupes.*—As an emergency measure of providing work for the Chenchus consequent on the cessation of plantation work, clearfelling of ' emergency coupes ' in the vicinity of Chenchu gudems was undertaken in 1919 and was continued till 1925, when they were abandoned as the undertaking proved to be definitely unremunerative and destructive of forest growth. The following statement shows the localities in which such fellings were undertaken. They have also been shown on the stock maps :—

Locality.	Years of working.	Area felled in acres.	Locality.	Years of working.	Area felled in acres.
(1)	(2)	(3)	(1)	(2)	(3)
Chinnamantrala ..	1920–24	60·0	Magaturu	1919–22	73·0
Peddamantrala ..	1920–25	72·0	Guttalachenu ..	1920–25	47·0
Chintala	1919–25	140·0	Madigamikunta ..	1919–22	61·0
Telugurayanicheruvu ..	1920–25	113·0	Tummalabailu ..	1920–25	124·0
Regatikunta	1919–25	134·0	Maddipenta	1921–22	28·0

Efforts at artificial regeneration were made in felled coupes but these were so unsuccessful and expensive that they were abandoned. Besides these emergency clearfellings, the exploitation of mature and marketable trees from the forest surrounding the coupes was undertaken more as a measure of producing revenue than for silvicultural considerations. Such unregulated and scattered fellings continued till the working plan by Mr. Sarma came into operation.

156. *General.*—The inauguration of the working plan for Kurnool East by Mr. Sarma and that for Giddalur and Gundlakamma by Mr. Sundaram marks a turning point in the history of timber exploitation, since unsystematised fellings were replaced by carefully thought out prescriptions for felling and regeneration. It is found more convenient to deal with the operations under each working plan separately.

Mr. Sarma's working plan.

157. *Felling.*—Under Mr. Sarma's working plan for Kurnool East a timber working circle with three series was constituted out of the best areas available in the localities of Mogilutla, Tummalabailu and Maddipenta, with the object of replacing the existing crop by a better one, under a system of improvement *cum* clearfelling, accompanied by artificial regeneration in 'rab' lines to supplement existing natural regeneration. A preliminary seed felling, consisting in the removal of all species other than teak, *Terminalia tomentosa, Pterocarpus marsupium, Dalbergia latifolia, Sapindus emarginatus* and *Bassia latifolia*, followed by a final felling in the sixth year was prescribed. Existing natural regeneration of utilizable species was to be cut back and the coupe early burnt every year, till after the final felling, when it was to be rigidly protected from fire. A rotation of 40 years was adopted for the production of poles of 24 inches in girth and for beams of three feet mid-girth. Discretion was allowed to the Conservator to restrict fellings to market requirements.

158. *Deviations sanctioned.*—In 1931, a deviation was sanctioned to defer final fellings till after the sixth year as the regeneration was not considered sufficiently established. In 1934, another deviation was sanctioned to clearfell *directly* the remaining coupes in each series in addition to doing final felling of the coupes already seed felled. Experience indicated that the seed fellings produced little revenue since all timber species were reserved for the final felling, and that regeneration efforts could be more concentrated instead of being diffused over several coupes every year. The following statement shows the areas worked and the yield and net revenue obtained :—

	Mogilutla series.				Thummalabailu series.				Maddipenta series.				
Year.	Coupe number.	Area.	Yield.	Net revenue obtained.	Coupe number.	Area.	Yield.	Net revenue obtained.	Coupe number.	Area.	Yield.	Net revenue obtained.	Nature of fellings.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
		ACS.	C.FT.	RS. A.		ACS.	C.FT.	RS. A.		ACS.	C.FT.	RS. A.	
1928-29 ..	I	37·6	1,362·4	180 0	I	18	684	100 14	I	22	587	249 12	Preliminary fellings.
	II	40	559	57 0	II	24	936	119 0	II	20	485	229 8	Do.
1929-30 ..	III	40	806	50 11	III	20	921	70 3	III	35	Not worked.	105 0	Do.
	IV	21	844	114 2	IV	20	928	71 5	IV	33	Do.	74 4	Do.
1930-31 ..	V	52	Not worked.	87 12	V	20	Not worked.	35 0	IV	17	164	55 9	Do.
1931-32 ..	V	52	1,042	Loss 99 0	Series closed down—vide Bellary Circle Conservator's M. 2·810/31, dated 26th August 1931.				V	15	185	Loss 39 12	Do.
1932-33 ..	VI		No felling.		..	..	..	..	VI		No felling.		
1933-34 ..	I	37·6	2,111	136 5	..	..	..	..	I	22	288	44 0	Final felling.
1934-35 ..	II	43	5,555	559 0	..	..	..	..	II	20	2,336	41 4	Do.
1934-35 ..	VI	52	6,558	507 0	..	..	..	..	..	..	..	..	Preliminary and final fellings'
1935-36 ..	III	40	5,979	620 0	..	..	..	..	III	35	8,010	474 11	Clear felling.
1935-36 ..	VII	53	10,052	768 8	..	..	..	..	..	..	..	..	Do.
1936-37 ..	IV	21	4,009	183 12	..	..	..	..	IV	17	1,271	153 0	Do.
1936-37 ..	VIII	44	6,043	319 0	..	..	..	..	..	..	..	..	..
1937-38 ..	V	52	7,221	325 0	..	..	..	..	V	15	No felling.	..	Clear felling.
1937-38 ..	IX	75	14,852	1,162 8	..	..	..	..	..	..	..	..	Do.
1938-39 ..	X	88	11,714	748 0	..	..	..	..	..	..	No felling.	..	..

159. *Regeneration.*—The working plan contemplated a somewhat over-ambitious attempt at regenerating the felled coupes, consisting in burning the debris compacted to a height of 4 feet in rab lines 10 feet wide and spaced 40 to 45 feet apart, and sowing seeds of *Terminalia tomentosa, Pterocarpus marsupium, Dalbergia latifolia* and *Anogeissus latifolia* in the burnt ash in the month of March. The 'rab' regeneration work was to be repeated in all its complete details after the final felling, and during the period between the two fellings cutting back of seedlings below 6 inches in girth and early burning of the coupes accompanied by broadcast sowing were prescribed. The 'rab' lines after final felling were intended to be located in lines other than those originally dealt with after seed felling. The annual coupes were to be early burnt every year till after the final felling, when they were to be rigidly protected during the remaining period of the plan. Unfortunately the working plan failed to lay down how the rigid fire protection was to be effected. It was generally prescribed that such weeding as might be necessary would be carried out. 'Rab' regeneration work was accordingly undertaken in the first five coupes

of the Mogilutla series between the years 1929 and 1932, but the results have been a dismal failure as will be seen from the following enumeration figures given in the Control Journal for 1932–33 :—

Coupe number.	Area.	Number of 'rab' patches.	Number of seedlings on rabs	Coupe number.	Area.	Number of 'rab' patches.	Number of seedlings on rabs.
(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	ACS.				ACS.		
I ..	37·6	1,101	115	V ..	52·0	275	1,107
II ..	43·0	530	73				
III ..	40·0	626	265	Total ..	193·6	2,883	1,746
IV ..	21·0	351	186				

160. *Amendments.*—In Chief Conservator's Proceedings No. 331, Press, dated 19th July 1932, the following amendments were made. Emphasis was laid on the fact that the seeds should be sown on 'rab' lines in May after working the soil and fixing the ash, and that early burning and cutting back 'rab' seedlings should not be done. Weeding the 'rab' lines by beat subordinates was prescribed. A welcome departure was made by replacing departmental exploitation by sale of standing trees to contractors. Natural regeneration was systematically cut back and the coupes were early burnt till 1932. Some weedings were also done. Natural seedlings were tended in all the felled coupes and cutting back was systematically carried out.

161. *Results of regeneration operations.*—Unfortunately the expectations of the Working Plan Officer in respect of 'rab' regeneration have not been realized : in a locality which receives an annual rainfall of about 40 inches and where soil conditions are fairly hospitable, and ample material for burning is available 'rab' regeneration work should in the ordinary course be an assured success. The failure of regeneration may be attributed to one or more of the following causes :—

(*a*) The regeneration operations had to be done free of cost by the subordinates with the result that the operations may not have been carried out efficiently or in proper time.

(*b*) Too intense a burn may have proved detrimental to germination and subsequent development.

(*c*) Inexperience on the part of the local staff.

162. *Natural regeneration.*—Felled areas especially in the Mogilutla series are stocked with a fair amount of natural regeneration of valuable species, and re-growth from coppice is fairly vigorous. The following statement gives an idea of the amount of natural regeneration present in the felled coupes based on enumerations made by the district staff periodically :—

Mogilutla Series, Dornal Range.

Coupe number.	Area.	Year of enumeration.	Number of seedlings.	Number per acre.
(1)	(2)	(3)	(4)	(5)
	ACS.			
I	37·6	1933–34	17,449	464
II	43·0	1933–34	15,344	357
III	40·0	1935–36	31,723	793
IV	21·0	1935–36	6,366	303
V	52·0	1933–34	12,553	241
VI	52·0	1935–36	76,877	1,373
VII	53·0	1936–37	15,763	297

Mr. Sundaram's working plan for Giddalur, Gundlakamma Ranges.

163. *Selection* cum *Improvement Working Circle.*—Under the working plan a selection *cum* improvement working circle with a total area of 2,440 acres was constituted out of the best of the timber areas available on good soil on the Iskagundam plateau. The working plan adopted a felling cycle of 20 years and prescribed the following girth limits :—

Teak, *Terminalia tomentosa*, and *Dalbergia latifolia* ..	4½ feet and above in girth.
Pterocarpus marsupium, *Bassia*, *Adina cordifolia*, *Stephegyne*	5 ,, ,, ,,
Anogeissus latifolia	3 ,, ,, ,,

All unsound and badly grown trees irrespective of girth and all sound trees of and above the exploitable girths prescribed were to be exploited provided the felling in any case was not likely to create a blank larger than one chain square. All inferior unsaleable trees interfering with superior species were to be girdled. Seedlings of valuable species of and above one foot in height likely to be damaged by fire were to be staked and cut back in worked coupes, and the areas early burnt for five years. The coupes were thereafter to be rigidly fire protected. Regeneration measures consisted in sowing seeds of teak, *Pterocarpus*, rosewood and *Terminalia* on rab patches 50 feet by 4 feet. Climber cutting was provided. In accordance with the above prescriptions Coupes I to IX consisting of

an area of 943 acres were exploited between the years 1930 and 1939, yielding 36,745 cubic feet and a revenue of Rs. 31,068. An amount of Rs. 160 was spent on tending and regeneration operations. The prescriptions of the working plan in regard to the removal of unsound and badly-formed trees, as well as with regard to the removal of inferior species interfering with superior species were vague and elastic. The regeneration operations envisaged in the working plan have not been productive of satisfactory results. The 'rab' patches in the initial stages of working were too small, and were lost sight of. The question of introducing regeneration in gaps in a forest of light demanding species is open to criticism both on silvicultural as well as on economic considerations. Against a large revenue of Rs. 31,068 obtained from these coupes the insignificant small amount of Rs. 160 only was spent on regeneration measures. Felled areas contain a reasonable amount of natural regeneration which if tended suitably would more than compensate for the trees felled.

164. *Clearfelling Working Circle.*—The working plan constituted a clearfelling working circle (which was a misnomer, and would have been more aptly described as a pole working circle) consisting of an area of 16,589 acres of pole forests of deciduous timber species. Five felling series were constituted of which one was a reserve series. A system of clearfelling with the retention of advance growth and poles of valuable species up to a girth of 18 inches, was adopted. The rotation was fixed at 60 years. Seedlings and saplings of valuable species were to be cut back in felled coupes which were to be early burnt for five years, followed by rigid fire protection. Valuable fruit bearing trees were to be retained. Regeneration operations were to consist of sowing seeds of valuable species 6 inches by 6 inches before the end of April on 'rab' patches 100 feet by 10 feet. The following statement shows the coupes worked under the above prescriptions :—

Series.	Total area of series.	Coupes felled.	Area.	Years of working.	Revenue obtained.		Amount spent on regeneration.
(1)	(2)	(3)	(4)	(5)	(6)		(7)
	ACS.		ACS.		RS.	A.	RS.
Iskagundam	3,096	I to X	473	1930–40	7,702	0	261
Reserve	2,552	Not felled as there was no demand.					
Bodi	3,900	I to II	103	1930–35	227	8	22
Sandrapodu	3,276	I to VIII	439	1930–38	9,472	8	240
Mamidigundam	3,765	I to VII	384	1930–38	4,833	8	105

165. *Timber Working Circle under the Chelama plan.*—Under the working plan for the Chelama forests by Mr. Sundaram, a timber working circle was constituted out of which two series fall within the Gundlakamma range and the rest in Kurnool West. The system was coppice with standards with a rotation of 120 years for the standards and 60 for the coppice. Standards were to be selected from specified species of straight and sound habit of and above one foot in girth and not exceeding 30 per acre. Besides reserving the standards, no straight and sound saplings of specified species of and below 6 inches in girth were to be felled. Thorny climbers and shrubs were not to be cut. Coppice regrowth and natural regeneration were depended upon for re-stocking felled areas. 'Rab' patches were to be formed on blanks, and seeds of timber species were to be sown on the 'rabs' as well as planting some teak stumps.

The following coupes were worked under the above prescriptions :—

Series.	Area.	Year of works.	Coupes.	Area.	Revenue.	Amount spent on regeneration.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ACS.			ACS.	RS.	RS.
Vedurlakonda	7,276	1936–40	I to XIV	1,194	11,155	211
Malakondapenta	8,646	1926–39	I to XIII	1,545	11,710	193

166. *Discussion on coppice with standards system.*—The adoption of a system of coppice with standards for these forests is open to question.

(*a*) Under normal conditions the factors of the locality are incapable of producing trees in a sound condition above 3 feet in girth, the average girth being much less.

(*b*) A girth of 2½ feet will be attained in these localities in a period of about 50 years.

(*c*) The retention of standards up to an age of 120 years is bound to result in loss of increment, in stagnation and in unsoundness of the trees.

(*d*) In an open deciduous type of forest, with a fair amount of natural regeneration of timber species, the retention of standards is silviculturally undesirable.

(*e*) That the standards will help in reducing the incidence of grass is a debatable point, since the forest is already open and with even the existing stand of trees the growth of grass is tall and dense.

(*f*) Unsoundness in trees sets in early probably due to extremes of climatic variations and lack of moisture in the soil, and partly due to fires.

(*g*) Standards are a worry to the subordinates, form a temptation to contractors and have consequently led to many illicit fellings in the past. It was after considerable thought that standards were given up in fuel coupes.

(*h*) Trees of valuable species of and above 12 inches in girth find a ready and remunerative sale except yegi, in whose case, a girth of 18 inches is necessary.

The retention of standards has therefore nothing to recommend it. A suitable system would be to clearfell the areas on a rotation of 50 years or so with the object of producing poles of about 2 to 2½ feet in girth, with retention of advance growth of valuable species up to about 12 inches in girth.

167. *Timber in bamboo areas.*—Under Mr. Sundaram's working plan for Chelama Range, exploitation was prescribed of timber trees of and above 3 feet in girth from two bamboo series which fall within Gundlakamma range. Each series was to be worked for timber on a cycle of 30 years. The following statement shows the results of working :—

Series.	Total area	Years of working.	Coupes worked.	Area.	Yield.	Revenue obtained.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ACS.			ACS.	C. FT.	RS.
Tunnel	2,500	1926–38	I to XII	1,088	5,688	1,245
Malakondapenta	2,242	1926–38	I to XII	1,015	20,019	4,284

Exploitation was done departmentally and the produce was sold in periodical auctions.

168. *Pterocarpus Marsupium (yegi) timber.*—In Chief Conservator's Proceedings No. 331, dated 19th July 1932, an area of 7,000 acres in Ganjivaripalli range was constituted into ' The Chinnarutala yegi selection series ' for the exploitation of *Pterocarpus marsupium* (yegi) trees above a breast-height girth of 42 inches, on a 3-year cycle. The results of working are shown below :—

Year.	Coupe.	Area.	Yield.	Net revenue.		
(1)	(2)	(3)	(4)	(5)		
		ACS.	C.FT.	RS.	A.	P.
1931–32	III	2,644	110	84	0	0
1932–33	I	2,326	129	148	6	0
1933–34	II	2,230	121	135	0	0
1934–35	III	2,644	121	175	5	0
1935–36	I	2,326	137	196	0	0
1936–37	II	2,230	77	81	6	0
1937–38	III	2,644	88	163	0	0

The timber obtained from the series was converted into spokes and felloes and sold in periodical sales. Annual coupes are large, the yield obtained is small, exploitation is confined to pockets where occasional exploitable trees occur, and at present trees of exploitable size are rare. The series will be abandoned. No regeneration measures were undertaken.

169. *Miscellaneous Working Circle under Mr. Sarma's plan.*—A Miscellaneous Working Circle for the supply of timber was constituted under Mr. Sarma's working plan the objects being—

(*a*) to extract overmature, hollow or windfallen trees of saleable species from any part of the division as a measure of providing employment for the Chenchus ;

(*b*) to extract dead trees from the annual bamboo coupes of Dornal range for sale as rafters ; and

(*c*) to exploit from type C (timber) forest big timber trees, whose further retention was not considered economically advisable.

Fellings were to be undertaken subject to market requirements. In Dornal range, timber fellings were to be confined to hollow and unsound *Pterocarpus marsupium* (yegi) trees only, subject to a maximum production of 50 sets of spokes and felloes per annum. The extraction of 1,000 cubic feet of *Hardwickia binata, Terminalia tomentosa* and *Bassia latifolia* timber from B and C types of forest to meet the local demand for timber was also contemplated in the plan. A girth limit of 42 inches at breast height was prescribed for such fellings. The results of working are given in the subjoined statement :—

Period.	Quantity exploited.
1929–35	519 yegi trees.
1928–32	7,055 rafters (mostly teak).
	4,336 c.ft. of timber.
1932–35	911 c.ft. of timber.

170. *Discussion.*—A prescription made with the intention of undertaking diffuse exploitation over extensive areas, which is impossible of effective control by the inadequate staff, unaccompanied by any cultural or improvement measures, but solely as a measure of providing work for the Chenchus, would, while far from effecting any improvement in the crop, have resulted in over exploitation by affording a convenient cloak to the thieving Chenchus not only to fell and convert living healthy trees but also to supply illicitly obtained timber to the plainsmen below. Between the years 1928 and 1932 on an average about 1,800 poles, mostly of teak, each less than 24 inches in girth, were extracted, under the guise of dead wood operations. In the event of not finding dead wood rafters, it is not improbable that the unscrupulous Chenchus would have converted living poles into dead before effecting removal.

Softwood.

171. *Exploitation.*—A Softwood Selection Working Circle with an aggregate area of 85,338 acres distributed into two felling series, one in Dornal and the other in Turimella range, was constituted under Mr. Sarma's working plan for the supply of wood for slate frames to the slate industry at Markapur. Exploitation was on a selection basis with a girth limit of 42 inches over bark at the base of the tree for the following exploitable species :—

Givotia rottleriformis, *Gyrocarpus jacquinii*, and
Sterculia urens, *Bombax malabaricum*.

The right to fell and remove marked trees was sold in auction. A felling cycle of 10 years was adopted. No regeneration measures were contemplated.

172. *Results of working.*—The following statement shows the results of working :—

Series.	Area of series.	Years of working.	Coupes worked.	Area.	Yield obtained.	Revenue obtained.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ACS.			ACS.	C.FT.	RS. A. P.
Dornal Range	11,868	1928–36	I to VIII	8,955	14,702	3,875 7 0
Turimella Range	73,470	1928–38	I to X	73,470	25,801	3,993 12 0

Coupes, especially in Turimella range, have been unmanageably large, outturn low and the net revenue was much below working plan expectations. During 1936–38 coupes in Dornal range series remained unsold owing to the narrow margin of profit the operation leaves to the contractors due to competitive supplies of ready made frames from Kallai (Malabar) at lower rates.

Small timber.

173. *Exploitation under Mr. Sarma's plan.*—Under Mr. Sarma's working plan a Selection Working Circle with an aggregate area of 39,371 acres was constituted in Ganjivaripalli and Turimella ranges with the object of supplying agricultural implements and building materials, and, at the same time, to provide work for the Chenchus. Four felling series were constituted, and a felling cycle of 10 years was adopted, so as to extract, as quickly as possible, scattered mature *Hardwickia binata* (yepi) trees before they deteriorated further. The method of working was on a selection basis with a girth limit of 42 inches at breast height for *Hardwickia binata* (yepi) and 18 inches for other species, if such trees were not likely to survive the ten-year period. No tree was to be marked for felling if other trees were not coming up to take its place. Fellings were to be restricted to market requirements.

174. *Results of working.*—The following statement shows the results of working :—

Series.	Area of series.	Years of working.	Coupes worked.	Area.	Net revenue.	Yield.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ACS.			ACS.	RS. A.	C.FT.
Guttalachenu	19,904	1928–38	I to X	19,904	1,180 9	1,143
Telugurayani cheruvu	12,928	1928–38	I to X	12,928	1,131 4	1,936
Regumanipenta	5,288	1928–38	I to X	4,288	426 3	1,603
Papinenipalli	2,251	1928–38	I to VII	1,435	1,693 11	3,904

175. *Method of exploitation and sale.*—Extraction was done under departmental supervision with Chenchu labour and the produce was sold in periodical auctions. In Papinenipalli series (Turimella range) departmental working was resorted to only when the coupes could not be sold. Coupes I, III (part) and VI were worked under departmental supervision and the rest by contractors. In actual practice, marking was confined to selected accessible areas forming a small fraction of the annual coupe, to produce the requisite yield prescribed in the annual plan of operations. Only sound trees were exploited since deteriorating and unsound trees neither attract the shrewd Chenchu axemen nor command a reasonable sale value. The important silvicultural safeguard that adequate natural growth should be present to take the place of the tree felled has been ignored. The undertaking of fellings in areas deficient in natural regeneration, unaccompanied by efforts at artificial regeneration, is open to criticism.

176. *Supply of agricultural implements from Dornal Range.*—In 1932, under C. C. P. No. 331, Press, dated 19th July 1932, an area of 3,176 acres in Dornal range was constituted into two felling series for supplying agricultural implements on a selection basis, on a ten-year cycle. Dead, dying and ill-grown trees fit for small rafters and agricultural timber were to be felled. Though no girth limit was prescribed, in actual practice *Hardwickia binata* trees of and over 42 inches in girth only were extracted. No regeneration measures were either prescribed or undertaken. The following statement shows the coupes felled :—

Series.	Area of series.	Years of working.	Coupes felled.	Area.	Revenue obtained.	Yield.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ACS.			ACS.	RS.	C.FT.
Peddachama	634	1930–38	I to VI	415	877	7,406
Chintala	2,542	1930–38	I to VII	1,575	1,142	6,671

177. *Agricultural implements supply under Mr. Sundaram's plan.*—Under Mr. Sundaram's working plan for Giddalur and Gundlakamma ranges an agricultural implements working circle with an aggregate area of 28,828 acres, divided into six felling series

(two of these series, Tadutla and Barlakunta were reserve series and were to be worked only if there was demand) was constituted with the object of supplying agricultural implements and building materials to the rural population. The series were located in the terai portions of the Veligondas and Uyyalvada Extension reserves. A rotation of 30 years was fixed, and a system of selection coppice was prescribed. The retention of advance growth of specified species, of and below 12 inches in girth and of *Hardwickia* of and below 18 inches in girth was prescribed. In addition fruit-yielding trees were to be retained. The contractor was permitted to fell whatever material he wanted out of the unmarked trees. Rab regeneration was prescribed.

The following statement shows the area felled :—

Series. (1)	Area of series. (2)	Years of working. (3)	Coupes worked. (4)	Area. (5)	Yield. Timber. (6)	Yield. Fuel. (7)	Revenue obtained. (8)	
	ACS.			ACS.	C.FT.	C.FT.	RS.	A.
Tadutla (Reserve series) ..	3,179	1933–38	I to V	538	1,606	41,180	1,084	2
Barlakunta (Reserve series).	4,156	1936–37	I	73	209	6,780	175	0
Mallalama	7,660	1933–38	I to V	983	1,914	140,104	3,169	2
Chintalapalli	4,663	1930–38	I to VII	867	29,267	151,060	2,912	12
Yerraguntla	4,906	1932–38	I to VI	749	37,332	40,580	1,268	10
Veerareddikunta	4,264	1930–37	I to VI	736	4,478	130,040	1,703	14

178. *Result of working.*—Most of the series have been worked for the supply of fuel to Cumbum, Giddalur and other rural parts and for some agricultural timber. Most of the areas do not contain trees suitable for agricultural implements. ' Rab ' regeneration has been perfunctory and generally unsuccessful.

179. *Discussion.*—The silvicultural wisdom of retaining so-called advance growth of poles in a poor open type of forest is open to criticism, since the one object of undertaking the fellings was to obtain clean coppice regrowth. Trees of 12 inches and above in girth are rare in these forests except *Hardwickia*, which grows to about 2 feet 6 inches. Restriction in the trees to be felled must have been an impediment to contract working. Though the plan did not prescribe closure of felled areas to grazing, in practice the coupes have remained closed.

180. *Supply of Hardwickia timber.*—A coppice with standards working circle with an aggregate area of 2,850 acres in the Uyyalavada reserve and its extension was constituted under Mr. Sundaram's working plan for Giddalur-Gundlakamma with the object of supplying *Hardwickia binata* timber. All sound and well-grown trees of *Hardwickia* and trees of *Anogeissus latifolia* of and below 12 inches in girth were to be retained. A rotation of thirty years was adopted, presumably for the coppice; no rotation was fixed for the standards. ' Rab ' regeneration measures were prescribed but the results have been disappointing. The area contains a fair amount of natural regeneration of *Hardwickia* in groups but the crop as a whole is very open. Coupes I to IV were worked between the years 1932 and 1937 yielding a revenue of Rs. 393–8–0.

Bamboos.

181. *Bamboo working in early years.*—Exploitation of bamboos in the past has been perfunctory partly due to unsatisfactory communications and partly due to lack of labour skilled in bamboo working.

182. *Permit system.*—The ' Permit system ' appears to have been in vogue till 1905, when attempts were made to lease out small coupes to a contractor, who had to buy all bamboos collected by the Chenchus at specified rates, and, in addition, the contractor had the right to fell and remove bamboos directly from the coupes with imported labour. This system proved inconvenient and unworkable in many respects, and eventually departmental extraction of bamboos with Chenchu labour was undertaken. An impetus was given to bamboo working in 1916 by teaching the local Chenchus the art of splitting bamboos, under the guidance of an expert imported from Bairluty. A rotation of two years was adopted. Exploitation was confined to easily accessible localities and was never complete in any one locality, with the result that large areas were left untouched or only partially exploited.

183. *Contract system.*—In 1927–28 the contract system displaced departmental working except in one series on the Gundlakamma plateau, where due to lack of communications, departmental exploitation has continued in order to provide work for the Chenchus.

184. *Constitution of series.*—The following felling series were constituted :—

	Series.	Area.
		ACS.
Mr. Sundaram's plan—		
Gundlakamma Range.	I	8,522 *
	II	6,600 *
	III	8,220 *
Giddalur	Bodi	20,650
	Othumadugu ..	9,875
	Guvvalapenta ..	10,202
Chelama working plan—		
Gundlakamma Range.	Tunnel	2,500 †
	Malakondapenta.	2,242
Mr. Sarma's working plan—		
Dornal range ..	Chilakacherla ..	16,435
	Chinnamantrala ..	15,387
	Peddamantrala ..	16,954
	Peddachama ..	24,416
Ganjivaripalli ..	Nekkanti ..	23,000
Markapur	Markapur ..	16,293
Turimella	Maddipenta ..	3,904
	Turimella plains ..	8,960
	Total ..	194,160

* All on the Iskagundam plateau.

† Part of this series lies in Chelama.

185. *Felling cycle and felling rules.*—A felling cycle of three years was adopted and the following rules for felling were prescribed :—

(*a*) Culms cut, as well as dead culms, should be fully extracted out of the clump.

(*b*) The culms left should be evenly distributed over the clump. Culms should not be cut more than one foot from the base.

(*c*) Culms less than two rains old should not be felled.

(*d*) At least six mature culms should be left in each clump exploited.

186. *Results of working.*—Coupes in all the series were regularly sold till 1931, when demand for the Markapur series ceased, owing to scarcity of bamboos, poor quality of the culms, and difficulties of transport over long leads. The other coupes have been worked regularly. A list of bamboo coupes exploited has been given in Chapter III of Part I. Nekkanti series is exploited departmentally, chiefly for walking and goading sticks, which the Chenchus collect at scheduled rates, and which are sold periodically at Guttalachenu. Provided the road from Regumanipenta to Guttalachenu is put in order this series will command a better sale value. The coupes in the three series on the Iskagundam plateau have invariably been clubbed together and sold as a single lease.

187. *Departure due to flowering.*—Owing to the flowering of bamboos in old Kurnool East Division the right to extract flowered bamboos from coupes other than the current ones was also leased out, along with the annual coupes, in 1937–38. This was not, however, allowed in 1938–39.

188. *General.*—Considerable advancement has been made in bamboo working. Contract enterprise has almost entirely replaced departmental exploitation. The felling cycle was rightly raised from two to three years. Silvicultural regulations were prescribed. Exploitation is still short of the possibility. Remoter areas receive scanty attention and the tendency towards excessive exploitation in accessible localities persists.

Fuel.

189. *Early history of fuel working.*—The remoteness of important rural centres which are likely to consume forest firewood, and of the railway, from the forests of old Kurnool East division, the poorness of the quality of the forest bordering on villages and difficulties of transport over unopened and rugged country have precluded the undertaking of systematic fuel operations in the past in Kurnool East (old). Railway engines were utilizing firewood till coal replaced it towards the end of the last century, and the only forests which were exploited for this purpose were those adjoining the railway line between Tunnel and Diguvametta. From the time of reservation till about 1907 the Veligondas were closed to exploitation. Between the years 1907 and 1914 only dead firewood was extracted, under departmental supervision, for supplying the newly opened depots at Cumbum, Komorole, and Diguvametta. The depots were eventually closed down in 1914–15 as the undertaking proved unremunerative. Between 1920 and 1925 seven fuel coupes with a total area of 350 acres were worked in the North Veligondas but the authority for this is not available. During 1925 there were six fuel series in the Veligondas, two in each of the reserves. During 1925–26 a tentative scheme by Mr. Sundaram was sanctioned and the following areas were worked :—

Series. (1)	Years of working. (2)	Coupes felled. (3)	Area. (4)
			ACS.
Mallalamma	1926–30	I to III	536
Barlakunta	1926–27	I	120

190. *Working schemes.*—Under working schemes of a temporary nature sanctioned by the Conservator the following fuel coupes were felled in Turimella range prior to the introduction of Mr. Sarma's working plan :—

	Coupes.	Area.
		ACS.
Somidevipalli	I to X	497
Tummalapenta	I to IV	113

Two more series at Boggulasorava and Utla were contemplated at the time but were not constituted for want of a satisfactory demand.

191. *Fuel working under Mr. Sundaram's plan.*—Under Mr. Sundaram's working plan a simple coppice working circle with an aggregate area of 8,486 acres distributed among three felling series of which one was a reserve series, was constituted with the object of supplying fuel. The coupes have not attracted much competition and they have been sold for a nominal price. The system was simple coppice with a rotation of 30 years. 'Rab' regeneration was prescribed but the results have been disappointing.

192. *Results of working.*—The following statement shows the results of fuel working under both the plans :—

Series. (1)	Area of series. (2)	Years of working. (3)	Coupes worked. (4)	Area. (5)	Fuel, yield. (6)	Revenue obtained. (7)
	ACS.			ACS.	C.FT.	RS. A.
		Giddalur Range.				
Diguvametta	2,400	1930–38	I to V	335	36,037	721 10
Kothakota	2,606	1932–36	I to IV	318	29,920	482 8
Sudulabodu (Reserve series).	3,480	Not worked.				

Series. (1)	Area of series. (2)	Years of working. (3)	Coupes worked. (4)	Area. (5)	Fuel, yield. (6)	Revenue obtained. (7)	
	ACS.			ACS.	C.FT.	RS.	A.
Turimella Range.							
Boggulasorava	300	1928–31	I to III	42	3,098	606	0
Somidevipalli	1,500	1928–34	XI to XIII	162	12,088	440	12
Tallapaya	900	1928–33	I to IV	89	7,257	302	12
Tummalapenta	1,668	1928–38	V to XI	400	200,102	3,149	4
Utla	900	1929–38	I to VIII	253	104,984	1,177	9
Vemulakunta	2,800	1929–38	I to VI	503	135,216	2,441	8
Bairenimula	1,000	1930–31	I	40	Not worked.	245	0
Bollapalli	1,200	1930–31	I	40	,,	100	0
Gurralakunda	932	1930–37	I to IV	131	25,725	382	4
Lingammayakurava ..	750	1930–31	I	32	1,800	116	0
Malemmanukunta ..	1,244	1930–31	I	40	200	160	0
Uppukonthipaya ..	1,288	1930–31	I	36	Not worked.	90	0
Markapur Range.							
Magatur	820	1928–34	I to IV	87	30,152	421	0
Regatikunta	866	1928–33	I to IV	66	26,876	180	0

193. *Experimental supply.*—An experimental fuel series in E.N. Block X was opened in 1931–32 with the object of meeting the fuel demand at Yerragondapalam. Two coupes, each of 26 acres, were sold in the years 1931 and 1933, at the rate of 8 annas per acre; thereafter the demand ceased.

Range. (1)	Series. (2)	Area. (3)	Years of working (4)	Coupes worked. (5)	Area. (6)	Yield. (7)	Revenue obtained. (8)	
	ACS.				ACS.	C.FT	RS.	A.
Yerragondapalam ..	Korindakonda ..	..	1931–34	I to II	51	12,993	25	8

194. *General.*—Fuel supplies in the past have been regular only in certain localities which supply the requirements of more important rural centres like Cumbum and Giddalur. Regeneration work in the past has been perfunctory and poorly executed. Species like *Cassia siamea*, *Dolichandrone crispa*, which are of little use as fuel, and teak, which cannot possibly be expected to thrive in poor dry fuel forests, have been introduced, instead of encouraging species like *Chloroxylon swietenia*, *Albizzia amara*, *Azadirachta*, *Cleistanthus*, etc.

Minor forest produce.

195. *Early history of minor produce.*—In dealing with the history of management of minor forest produce a distinction has to be made between ranges where Chenchu gudems and Chenchu rights exist, such as Dornal, Ganjivaripalli, Markapur and Turimella, and ranges where there are no Chenchus, viz., Giddalur and Gundlakamma. A connected record of the management of minor forest produce is not available in the District office.

196. *Chenchu rights.*—The Chenchus, under the rights admitted at the time of settlement, have the prior right to collect minor forest products for their *bona fide* domestic requirements, and the Forest Department holds the right to buy from them at fixed prices, all produce in excess of their domestic requirements. The items of produce over which the Chenchus have their right of pre-emption are honey, wax, tamarind, mango, myrobolams, soapnut, marking nut, wood apple, ippa and madappa seeds. In respect of some gudems the items are fewer. Collection is to be confined *strictly to natural growth and shall not be made from trees raised artificially or from protected areas.* The Chenchus can sell the produce only to the Forest Department or to their accredited agent, at market rates which are periodically fixed by the Collector in consultation with the District Forest Officer. The current rates are given below :—

	RS.	A.	P.	
Tamarind shelled	0	5	0	per quarter.
,, unshelled	0	2	3	,,
Kunkudu (*Sapindus emarginatus* fruits)	20	0	0	per putty *.
Mushti (*Strychnos nux vomica* fruits)	0	1	0	per measure.
Honey	0	8	0	,,
Wax	12	0	0	per quarter.
Sarapappu (*Buchanania latifolia* seed)	1	0	0	per measure.
Karakayulu (*Terminalia chebula* fruits)	20	0	0	per putty.
Kanuga (*Pongamia glabra*) seeds	30	0	0	,,
Ippa (*Bassia latifolia*) flower	0	0	6	per measure.
Gum	0	9	4	per quarter.
Horns	1	12	0	
		to		
	4	8	0	per maund.
Chilla ginjalu (*Strychnos potatorum* seed)	20	0	0	per putty.
Tangedu (*Cassia auriculata*) bark	10	0	0	,,
Rela (*Cassia fistula*) bark	8	0	0	per 500 lb.
Madappa (*Bauhinia vahlii*) leaves	0	8	0	per maund.
Karivepaku (*Murraya exotica* leaves)	0	4	0	per headload.
Tumki (*Diospyros melanoxylon*) leaves	0	6	0	per 100 bundles.

* One putty is 640 measures.

197. *Method of collection and disposal.*—Prior to Forest Settlement the Chenchus were collecting and disposing of minor forest produce without any restriction but since settlement their rights have to the extent pointed out above been curtailed, with the result that they have a perpetual grievance against the Forest Department. From the time of reservation minor forest produce was collected departmentally by Chenchu labour, and

the monopoly of buying the collected produce at fixed rates from Government depots was sold in public auction. From 1910 to 1915 collected produce was stored in certain depots and was sold periodically by the Range Officers. From 1916 to 1920 the right to purchase all minor forest produce collected departmentally was sold in public auction and the rates at which the products would be sold were fixed, and each kind of produce was auctioned separately. From 1920–25, the right to purchase all minor forest products in the reserves of the division was sold in public auction to the highest bidder. From 1925 to 1928 the rates at which each item of produce would be sold were fixed and the right to buy at such rates was sold in public auction. All this time collection was done departmentally, using Chenchu labour. In 1928–29 a departure was made for the first time by directly leasing to a contractor the right to buy from the Chenchus at scheduled rates. This system has been in force since, but the Chenchus are somewhat discontented as they are in the grip of the contractor and to that extent the Department has lost touch with the Chenchus. The average annual revenue derived from departmental collection between the years 1914 and 1928 was Rs. 1,142, whereas, the average annual revenue derived from contract working between 1928 and 1938 has been Rs. 1,853.

198. *Exploitation under Mr. Sarma's plan.*—Under Mr. Sarma's working plan the following provisions were made for the lease of minor forest produce :—

199. *Cassia auriculata.*—The system then prevailing of leasing the right to collect *Cassia auriculata* (Tangedu) bark once in two years from the reserves and the adjoining unreserves was continued. The ranges of Dornal and Ganjivaripally were coupled together as one unit of lease. The lease period was for two years from the 1st of April. The last sale was held in February 1938.

200. *Cassia fistula.*—The right to collect *Cassia fistula* (Rela) bark from the reserves and the unreserves adjoining them was sold in range units on a cycle of five years. The lease period was for one year from the 1st of April. The last sale for Dornal range was held in February 1938.

201. *Leaves.*—The right to collect *Bauhinia vahlii* (platter) leaves from the reserves of the division was leased annually from the 1st of April for a period of one year. Similarly the collection of *Diospyros* (Tumki) leaves was also leased as a separate unit. The lease of these two items was discontinued from 1937 as the quantity available for collection is small and it is unwise to allow contractors' coolies in the reserves for the small revenue derived.

202. *Other kinds of produce.*—All other kinds of produce were leased in public auction to a contractor, who had the right to buy the produce from the Chenchus at specified rates. Sales were held in September so that intending bidders may be able to assess the value of the tamarind crop when the tender fruits are on the trees. The lease period was one year from the 1st of October. The entire division was sold as one unit till 1935–36 when the division was divided into two units. The working plan failed to prescribe the unit of lease. The necessity to depart from the single range as a unit of lease is not apparent.

203. *Exploitation under Mr. Sundaram's plan.*—Under Mr. Sundaram's working plan the lease of *Cassia auriculata* was for two years, the area being divided into three farms for the purpose of lease. *Cassia fistula* bark was leased on a four-year cycle. *Diospyros melanoxylon* leaves and *Strychnos nux-vomica* were sold as separate units, each range forming a unit of lease. All other kinds of produce were sold collectively for each range as a unit. There are no Chenchus in Giddalur and Gundlakamma ranges and the leases are made outright to contractors who organize the collection themselves.

Grazing.

204. *Early history of grazing.*—The earliest authentic history of the management of grazing in Kurnool forests is the following extract from the District Manual of Kurnool published in 1886 :—

> "In the northern parts, where the jungle is poor, there are extensive grassy level lands which afford pasture to the numerous herds of cattle that resort to them from the Nellore and Kistna districts, and in seasons of scarcity as in 1877–78, they form most valuable sources of food-supply to the cattle in the plains. These grazing grounds are annually sold for about Rs. 700 or Rs. 800 to a renter who levies a fee of two annas on each head of cattle that grazes on them."

In 1890, proposals to reserve the terai forests at the foot of the Nallamalais were made. An idea was prevalent among the people that all areas constituted as reserves would be closed permanently to grazing, but it was proclaimed that the intention of Government was to regulate grazing but not to restrict it unduly. In 1893, the payment of a light fee on grazing in areas open to grazing was insisted on. The rates were—

	RS.	A.	P.	
Buffaloes	0	4	0	Per head.
Cows and bulls	0	2	0	"
Sheep	0	0	6	"

The western Veligonda forests, which were under special fire protection, were closed to all grazing. Grazing was allowed on payment of the prescribed fee in the reserves

of Cumbum, Markapur, North and South Veligondas. Free grazing was allowed in the terai forests of Markapur and Cumbum occupying an area of about 118 square miles which constitute the present eastern Nallamalai blocks. The realization of grazing revenue was through the agency of permit issuing clerks who were paid a percentage on the number of permits sold.

205. *Departmental burning suggested.*—Departmental burning of grazing grounds was suggested in 1896 by Mr. Peet who wrote in the following terms :—" I think we might save more of the forests than we do now, if we ourselves systematically fired some of the more important grazing areas, to remove another temptation; for if we do not fire these forests the graziers will."

206. *Closure to grazing.*—An area of 440 square miles of forest along the backbone of the Nallamalais which includes the timber areas of Dornal, Turimella, Gundlakamma and Giddalur ranges was closed to grazing for a period of 20 years from 1905 on the recommendation of Mr. A. W. Lushington, who considered grazing repugnant to silviculture and indirectly instrumental in causing annual devastating fires. In 1924, Mr. Tireman, Acting Chief Conservator of Forests, ordered the opening of the closed areas to grazing as he was of opinion that in these hill forests, which resemble the Coorg forests, the more grazing there is, the better for regeneration.

207. *Grazing rates raised.*—The grazing rates were raised to Re. 1 per cow for foreign cattle and three annas per cow for local cattle but on representations made by foreign cattle owners that their cattle remained in the forests only for a fraction of the year, a rate of four annas per quarter per cow was instituted for foreign cattle. The ranges were divided up into grazing blocks and a permit was valid for one block only. In 1902, on a mistaken representation by the Collector of Kurnool, all the eastern Nallamalai blocks were declared as special grazing areas. This was definitely a mistake, as, at the time of original reservation of these blocks, the intention was to reserve them for grazing purposes for agricultural cattle and to meet the requirements of the agricultural population.

208. *Mr. Lushington's opinion.*—In 1912, Mr. A. W. Lushington strongly advocated the policy of having grazing areas separated from other forests. In fact, he only reiterated the original proposal of Sir Dietrich Brandis in this respect. An additional argument in favour of separating the grazing areas from forests was that, while in the former the object of producing tree growth would be to obtain much branched and largely interspersed trees producing little wood and plants of green shoots, in the latter, the objective would be to produce tall, densely packed trees with plenty of wood and less of foliage and branches.

209. *Controlled grazing experiment.*—From an experiment by Mr. Lushington on controlled grazing by cows, sheep and goats, he derived the following conclusions :—

(1) That horned cattle and sheep eat the grass so long as it is green, in preference to shoots, for about three months in the year, but when the grass dries up sheep almost entirely exist on green shoots, while horned cattle require two-thirds of this green food in that way. Goats feed purely on green shoots of thorny shrub.

(2) That the grazing possibility for cattle was 2–4 acres per unit.

Elaborate details in respect of limiting grazing to the possibility of the forests were worked out at considerable pains. Excessive grazing would deplete the forest while insufficient grazing would tend to make the land relapse into jungle. Mr. Lushington strongly opposed the removal of living trees from grazing grounds.

210. *Position till 1915.*—Till 1915, the position with regard to grazing was as follows :—

(a) The ranges had been subdivided into grazing blocks.

(b) The reserves between the Sim's line and cultivation were treated as ordinary tracts for the privilege of grazing agricultural cattle at the reduced rates of—

	RS.	A.	P.
Buffaloes	0	6	0
Cows	0	3	0
Sheep	0	1	6

(c) All areas within the Sim's line were constituted into special grazing grounds for which fees of—

	RS.	A.	P.
Buffaloes	0	8	0
Cows	0	4	0
Sheep	0	2	0

per quarter were charged.

211. *Classification of cattle effected.*—In 1915, cattle were classified into three categories, and each had to pay a different rate for grazing. Cattle belonging to Lambadis and Sugalis or when they act as graziers for foreign cattle were charged a special rate of Re. 1 per cow. Cattle of local people resorting to pentas were charged four annas and non-penta cattle had to pay three annas per cow. The rates for Lambadi and

Sugali cattle and for ordinary cattle were enhanced in 1919–20. Village cattle were charged at the ordinary rates when they were not penned, and at special rates when they were penned within the reserves. The special classification of " enhanced rates " was removed and there remained only " special " and " ordinary " rates.

212. *Comparative rates.*—The following comparative statement shows the changes effected in the grazing rates since 1910 :—

Rate. (1)	Class of animal (2)	1910–15. (3) RS. A. P.	1915–19. (4) RS. A. P.	1919–20. (5) RS. A. P.	1920–24. (6) RS. A. P.
Special ..	.. Buffaloes ..	..	1 0 0	2 0 0	2 0 0
	Cows ..	..	1 0 0	1 0 0	1 0 0
	Sheep ..	..	0 8 0	0 8 0	0 8 0
Enhanced	.. Buffaloes ..	0 8 0	0 8 0	0 12 0	..
	Cows ..	0 4 0	0 4 0	0 6 0	..
	Sheep ..	0 2 0	0 2 0	0 3 0	..
Ordinary	.. Buffaloes ..	0 6 0	0 6 0	0 6 0	0 12 0
	Cows ..	0 3 0	0 3 0	0 3 0	0 8 0
	Sheep ..	0 1 6	0 1 6	0 1 6	0 4 0

213. *Kurnool Forest Grievances Committee.*—In 1925, a committee was constituted by Government to inquire into forest grievances in the Kurnool district. Their recommendations consisted in—

(1) reducing the fee on local cattle to three annas per cow unit if the permit was taken within three months from the 1st of April,

(2) closing worked coupes for a period of not less than six to seven years and that the reserves in the district except those that are required for silvicultural purposes, should be open to grazing,

(3) abolishing penning fees on local cattle, and

(4) increasing the number of pentas.

On this, Government in their Order No. 244, Revenue, dated 13th February 1925, waived the levy of extra penning fees on local cattle penned in approved pentas of the range, but refused to grant a general reduction of fees as it was opposed to their policy laid down in G.O. No. 1068, Development, dated 17th June 1921, and said that they would consider cases requiring special treatment. The other recommendations of the Committee were not considered.

214. *Reclassification of cattle.*—In 1925–26, a classification in the nomenclature of cattle was effected and revised rates were issued as follows :—

	Buffaloes. RS. A. P.	Cows. RS. A. P.	Sheep. RS. A. P.
Non-penta cattle	0 12 0	0 8 0	0 4 0
Penta cattle	2 0 0	1 0 0	0 8 0

Non-penta cattle included—

(1) Local cattle, i.e., cattle in villages whose limits include or adjoin a reserved forest boundary. Such cattle had the privilege of penning in approved pentas of the range without any additional charge.

(2) District cattle, i.e., cattle in villages, which are not included under local cattle, within the district of Kurnool. They were allowed day to day grazing without any additional charge, but if penning was required the difference between penta and non-penta rates was to be paid.

Penta cattle included—

(1) All cattle belonging to professional cattle breeders such as Lambadis and Sugalis irrespective of where they lived in the district.

(2) All cattle coming from districts outside Kurnool irrespective of whether they seek day grazing or penta grazing. Cattle belonging to Lambadi and Sugalis who own lands adjoining reserves will be charged non-penta rates subject to a maximum of one pair for every 30 acres of dry cultivation or portion thereof and two pairs of cattle for every 10 acres of wet cultivation.

215. *Range as a unit of grazing.*—In 1926, each range was declared as a grazing unit for which one permit was valid.

216. *Division as a unit of grazing.*—In G.O. Mis. No. 595, Development, dated 29th April 1932, the validity of a grazing permit was extended so as to cover a whole forest division. It was, however, provided that in divisions where differential rates prevailed in the ranges, the highest rate should be charged when permits were taken for a whole division, option being given to graziers to take out permits for one range only at the rate prevailing in that range. The order further directed that when penning is required in more than one range an extra charge of 50 per cent of the ordinary penning

rates may be levied. Accordingly in 1934 the following grazing fees were fixed and they have remained in force until 1938 :—

Kind of permit.	Buffaloes.	Cows.	Sheep.
(1)	(2)	(3)	(4)
	RS. A. P.	RS. A. P.	RS. A. P.
1 Non-penta cattle grazing only (whole division)	0 12 0	0 8 0	0 4 0
2 Penta cattle (grazing over whole division) and penning in one range.	2 0 0	1 0 0	0 8 0
3 Penta cattle (grazing and penning over the whole division)	2 10 0	1 4 0	0 10 0
4 Local cattle (grazing over the whole division) and penning fee in one range	0 12 0	0 8 0	0 4 0

217. *Reduction of grazing fees.*—Government in their Order No. 836, Press, Development, dated 29th March 1938, ordered the reduction of grazing fees by 50 per cent.

218. *Grazing incidence in the past.*—A statement showing the number of cattle that were licensed to graze in the reserves in the past is given below :—

Year.	Cows.		Buffaloes.		Sheep.		Total reduced to cow units.	Revenue obtained.	
	Penta.	Non-penta.	Penta.	Non-penta.	Penta.	Non-penta.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
								RS.	A.
1928–29	4,894	17,060	103	2,414	..	22,557	38,266½	* 21,079	12
1929–30	4,555	15,115	472	2,472	146	27,203	39,232½	* 21,784	4
1930–31	4,975	18,828	330	4,863	177	42,649	55,487	29,530	10
1931–32	6,068	16,940	355	3,845	162	40,557	51,767	28,325	14
1932–33	6,071	17,143	634	4,002	242	35,625	48,933	27,943	0
1933–34	5,788	20,166	868	4,872	196	36,830	55,818	31,274	4
1934–35	7,807	19,183	917	5,137	367	37,834	57,961	32,578	12
1935–36	10,080	21,055	842	5,568	381	39,993	64,092	36,663	10
1936–37	9,579	21,051	800	5,416	345	40,936	63,705	36,172	10
1937–38	6,681	20,105	712	5,559	577	35,450	57,323	31,465	4
Average	7,131	19,309	682	4,908	306	38,734	56,886	31,744	4

* Excludes Giddalur and Gundlakamma ranges.

Grass fodder.

219. *Early history.*—The history of the control and management of the collection of grass fodder from reserves is somewhat disconnected. The following information has been gathered. The Board of Revenue in their Proceedings No. 2363-Forest/180, dated 10th July 1884, prescribed the following rates for the removal of grass fodder from reserves :—

	RS. A. P.
Headload	0 0 3
Cartload	0 4 0

It has been recorded in an inspection note of the forest by Mr. A. W. Peet in 1893 that grass cutting was permitted free throughout the Nallamalais and the Veligondas, except in certain specified blocks. Government in their Order No. 569, Revenue, dated 13th July 1897, declared their policy that the District Forest Officer should persuade the ryots to use cut fodder, should invite the ryots to enter the reserves and collect grass fodder in head-loads, free of cost, where there is local demand and on payment where there is no local demand. Free removal of grass in head-loads was permitted in Kurnool West from 1908–09 (vide Conservator's annual report). Presumably this was done in pursuance of the policy laid down in G.O. No. 59, dated 18th January 1904, whereby the concession was extended to drought-affected tracts. In G.O. No. 910, dated 23rd March 1910, it was argued that the concessions of free removal could not be extended to cattle kept for breeding purposes but the Board of Revenue in their Mis. No. 193, dated 7th February 1910, stated that it was impossible to distinguish between agricultural and breeding cattle.

220. *Free removal.*—Free removal of grass in head-loads was permitted in G.O. No. 910, dated 23rd March 1910 and this privilege is being enjoyed by the people ever since.

221. *Rate on a cart-load.*—The rate for a cart-load of grass was raised to five annas as it was calculated that 20 head-loads would make a cart-load and that at the prevailing rate of three pies per head-load, a cart-load was worth five annas. In his inspection notes, dated 14th August 1914, the Revenue Member of the Board has recorded as follows : "Free cutting of grass is allowed in head-loads, but five annas a bandy-load is charged. In consultation with the Conservator, I issued orders that bandy-loads may be removed free of charge. This was for East Kurnool but the same concession . . . ." Removals in cart-loads do not, however, appear to have been allowed free of charge.

222. *Present practice.*—The existing practice is to allow removals in head-loads for *bona fide* domestic purposes free of charge and to levy a rate of five annas on cart-loads. The number of cart-loads of grass removed in the past is given below.

Year.	Number of cart loads removed.	Year.	Number of cart-loads removed.
1930–31	1,237	1935–36	3,127
1931–32	788	1936–37	5,436
1932–33	689	1937–38	5,068
1933–34	4,681	1938–39	1,981
1934–35	1,929		

Manure leaves.

223. *General.*—Another important item of minor forest produce which has been the subject of controversy between popular public opinion and departmental interests is the supply of manure leaf from the reserved forests to the agricultural population. This is one of the oldest and most vexed questions concerning the Forest department: so it has been found necessary to deal with the history of management of this particular item of produce in somewhat greater detail than it normally deserves.

224. *Early history.*—Prior to the year 1910 the demand for manure leaves was being met from the extensive unreserves and private lands and shrotriyam forests adjoining centres of consumption, with the result that the areas have been depleted of their stock and the supply from these sources has been gradually decreasing. Stringent restrictions were imposed on removals from reserved forests as the policy was that indiscriminate removal was detrimental to the conservation of the forests, which were intended to subserve more valuable purposes such as conservation of water-supply, prevention of erosion, etc. Consequent on the inadequacy of supplies from unreserved lands representations were made by the agriculturists to Government, who ordered that it was the duty of the Forest Department to meet this demand and towards this end experimental cultivation of manure leaf species was undertaken in several districts. In 1910, it was reported that the experiments were a failure. On this, Government in their Order No. 1605, dated 19th May 1911, declared that the function of the Forest Department as regards leaf manure would be restricted to the supply of *seed* to agriculturists for raising manure leaf crops on their own lands.

225. *Committee's recommendations.*—A committee was constituted in 1910 to inquire into this question. The enquiry elicited that much better crops could be grown with the aid of green manure crops raised on the land itself and ploughed in, than by the application of tree leaves. The mechanical effects on the soil of crops grown "*in situ*" and ploughed in were believed to be much more permanent than those of tree leaves carted from outside.

226. *Rates levied.*—From 1893 to 1910, the seigniorage rate on manure leaves was five annas per cart-load and Government in their No. 1605, dated 29th May 1911, ordered it to be raised to a level commensurate with the value of the produce removed. The Board of Revenue in their Proceedings Mis. No. 165, Forest, dated 30th January 1912, fixed a fee of Rs. 2 per cart-load but reduced it subsequently in their Proceedings No. 65, dated 29th March 1912, to Re. 1 as a temporary experimental measure. This reduced rate was, however, continued till 1918.

227. *Policy of Government.*—Once again Government declared their policy that removal of manure leaves from reserves should be discouraged as much as possible, and ordered that the Agricultural department should make arrangements for the supply of manure leaf seeds to the agriculturists, and that every endeavour should be made to induce the agriculturists to grow their own manure leaf crops on their lands. With a view to discouraging collection of leaves from the reserves the Board of Revenue in their Proceedings No. 12, dated 9th April 1918, raised the seigniorage fee on a cart-load to its former level of Rs. 2. The agriculturists strongly resented this and made several representations to the Governor, but were lethargic in raising manure crops on their own lands. The Government ordered the Chief Conservator of Forests and the Director of Agriculture to enquire into the question jointly and on their report they declared in their Order No. 1069, dated 17th June 1921, their policy that removal of manure leaves was detrimental to the forests and that the ultimate aim should be to prohibit altogether removal from reserves. However, in the year 1921, the seigniorage fee in the adjoining district of Cuddapah was reduced to Re. 1 per cart-load.

228. *Recommendations of Kurnool Forest Grievances Committee.*—The Forest Grievances Committee of Kurnool, which was appointed in 1925, while dealing with this question, recommended a reduction of the seigniorage rate to eight annas per cart-load, and the Chief Conservator of Forests recommended a rate of Re. 1, but the Government in their Order No. 244, Press, dated 15th February 1925, declined to reduce the rate from Rs. 2 in conformity with their declared policy of eventual prohibition.

229. *Interpellation in Legislative Council.*—The subject was again raised in the Legislative Council and a resolution was adopted stating that the seigniorage rate should

be reduced to six annas in the reserves under departmental control. The Collector of Kurnool reported that ample supply was available from unreserves and that steps could be taken to prohibit gradually removals from reserves, and recommended that no reduction in seigniorage rate was necessary. Government, in their Order No. 652, Development, dated 2nd May 1925, declared that the problem of manure leaves was of real importance only in the districts of North Arcot, Chittoor, Cuddapah and Kurnool in parts of which, owing to the precariousness of the sources of irrigation the cultivation of manure crops had not yet made sufficient headway and, while reaffirming their general policy that the ultimate aim should be total prohibition of collections from reserves where sufficient facilities for the raising of green manure crops on private land existed, were, at the same time, prepared to re-examine localities which required special treatment. The Chief Conservator of Forests and the Director of Agriculture were directed to examine this question. They recommended classification of districts on the following basis :—

(*a*) Where cultivation of green manure crops has advanced sufficiently and complete prohibition is possible,

(*b*) where facilities exist but advancement has been poor and immediate closure of reserves is not justifiable, and

(*c*) areas requiring special treatment due to precariousness of irrigation sources. Kurnool district falls in the last category. In their Order Ms. No. 2268, dated 20th December 1929, Government directed that the existing practice should continue in all the districts except in the areas in respect of which modifications were indicated. These do not concern this district. The Government did not approve of the recommendation of the Chief Conservator to replace the permit system by the system of leasing annual coupes. The Chief Conservator's recommendation that total prohibition should be introduced in four years' time was not accepted.

230. *Permits.*—The issue of permits for manure leaves was temporarily suspended for a year or two by the District Forest Officer on his own responsibility but the Conservator in his D. Dis. No. M2-50/36, dated 8th March 1936 ordered its revival.

231. *Results of working.*—The following statement shows the number of permits sold :—

Year	Number of permits sold. Reserves.	Unreserves.	Total.	Year.	Number of permits sold. Reserves.	Unreserves.	Total.
1932–33	50	43	93	1936–37	149	190	339
1933–34	120	69	189	1937–38	207	115	322
1934–35	106	194	300	1938–39	142	..	142
1935–36	22	243	265				

232. *Summary of past management.*—The history of forest management in the past is broadly divisible into three periods each having its own characteristic features of development.

233. *Period*, 1883–1904.—The period 1883–1904 saw considerable activity in the selection, demarcation and reservation of blocks of forests. Exploitation was under the "Licence and Voucher" system at a nominal rate incommensurate with the value of the produce removed, and was wasteful and destructive of forest growth. Illicit fellings were done on a large and organized scale by a cordon of timber thieves, who traded in the produce. Regeneration measures never aroused any interest. Fire protection measures were meagre and primitive. The grazing fee was at its lowest, two annas per cow unit. Free grazing was allowed in the terai portions.

234. *Period*, 1904–1928.—The period 1904 to 1928 is noteworthy in respect of conservancy and protection. The pernicious system of permit fellings was effectively stopped although illicit fellings continued to be a serious menace. Systematic fire protection measures were undertaken. Development of communications and buildings formed an important item of an organized programme. The necessity to conserve the forests primarily for the indirect benefits they confer on the district was emphasized. Large scale plantation work was undertaken at considerable cost, though it ended in failure. Emergency coupes were felled and the fellings were stopped as they were destructive of forest growth. Systematic exploitation of bamboo was done departmentally. Grazing rates were enhanced to eight annas per cow unit, and double the rates were levied on foreign and Lambadi cattle.

235. *Period*, 1929–1939.—The period 1929 to 1939 is marked by the initiation of regular sanctioned working plans for the division which in general have worked satisfactorily. Contract enterprise displaced departmental exploitation of forest produce in almost all the activities of the department. Regeneration operations were undertaken though the results have been discouraging. Liberal concessions were made in respect of grazing by making, at first, the permits valid for a whole range, and thereafter, for a whole division. Grazing rates were halved by the present Government.

236. *Comparative statement showing results of working.*—**The following statement gives full details as**

Comparative statement showing the prescriptions of working

			Prescription of the working plan.						
Working circle.	Working plan.	Area of working circle in acres.	System of working.	Rotation.	Felling cycle.	Series.	Years of working.	Area in acres.	Regeneration measures.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									Dornal
Timber Improvement cum Clear-felling Working Circle.	Kurnool, East, Working Plan by Mr. Sarma.	5,809 part in Turimella.	Preliminary and seed-felling afterwards changed to direct, clear felling.	40 years.	..	Mogilutla.	1928–29 to 1938–39.	570 subject to demand.	Rab with valuable species.
						Tummalabailu.	1928–29 to 1929–30.	570	..
Softwood Selection Working Circle.	Do.	85,338 part in Turimella.	Selection felling with a girth limit of 42″ over bark at the base of the tree.	..	10 years.	Dornal Range soft-wood series.	1928–29 to 1938–39.	11,868	Nil.
Bamboo Selection Working Circle.	Do.	158,758 parts in Ganjivaripally and Turimella ranges.	Selection thinnings of clumps.	..	3 years.	Chilakacherla.	Do.	16,435	Nil.
						Chinnamantrala.	Do.	15,387	..
						Peddamantrala.	Do.	16,954	..
						Peddachama.	Do.	24,416	..
Miscellaneous Timber Working Circle.	Do.	73,192	Removal and conversion of dead wood to saleable sound rafters.	..	..	Chilakacherla, Chinnamantrala, Peddachama, Peddamantrala B. & C. type of forests.	..	..	..
Agricultural Implement Working Circle.	Addendum to Mr. Sarma's plan.	3,176	Selection felling (dead, dying, and ill-grown trees fit for small rafters and agricultural implements).	..	10 years ..	Peddachama.	1930–31 to 1938–39.	634	..
						Chintala ..	Do.	2,542	..
									Gundlakamma
Timber Working Circle.	Chelama plan ..	Only part of the working circle lies in Gundlakamma Range.	Coppice with standards.	60 years for coppice and 120 years for standards.	..	Vedurlakonda.	1925–26 to 1935–36.	1,115	Rab with valuable species.
						Malakonda penta.	Do.	1,445	..
Selection cum Improvement Felling Working Circle.	Giddalur-Gundlakamma plan.	2,440	Selection cum improvement felling with stipulated girth limits for specified species.	..	20 years ..	Gundlakamma	1930–31 to 1938–39.	856	Rab with valuable species.
The Clear-felling Working Circle.	....	16,589 part is in Giddalur Range.	Clear felling with the retention of advance growth.	60 years ..	..	Iskagundam.	1930–31 to 1938–39.	462	Do.
						Reserving Felling Series.			
Bamboo Timber Working Circle.	Chelama plan ..	4,742 part in Gundlakamma Range. rest in Chelama.	Selection felling. Timber trees excluding softwood 3′ and above in girth.	..	30 years ..	Tunnel ..	1926–27 to 1935–36	831	..
						Malakonda penta.	Do.	741	..
Bamboo Working Circle.	Do. ..	20,939 part in Chelama Range.	Selection thinnings.	..	3 years ..	Tunnel ..	1926–27 to 1935–36.	2,500	..
						Malakonda penta.	Do.	2,242	..
Do.	Giddalur-Gundlakamma plan.	64,069 part in Giddalur Range.	Do.	..	Do.	Series 1 ..	1930–31 to 1938–39.	8,522	..
						Series 2 ..	Do.	6,600	..
						Series 3 ..	Do.	8,220	..
									Giddalur
The Clear-felling Working Circle.	Giddalur-Gundlakamma plan.	16,589 (part in Gundlakamma Range).	Clear felling with the retention of advance growth.	60 years ..	..	Sandrapodu.	1930–31 to 1938–39.	457	..
						Mamidigundem.	Do.	601	..
						Bodi ..	Do.	564	..
Bamboo Working Circle.	Do.	64,069 (part in Gundlakamma Range).	Selection thinnings.	3 years ..	..	Bodi ..	Do.	20,650	..
						Othumadugu.	Do.	9,875	..
						Guvvala penta.	Do.	10,202	..
Coppice with Standards Working Circle.	Do.	2,850	Coppice with standards. Leaving all sound and well grown *Hardwickia* and trees 12″ and below in girth of *Anogeissus latifolia* as standards.	30 years ..	..	Uyyalavada.	Do.	894	Dibbling seeds of Yepichirumanu, Nallamaddi, Billudu and Mushti.

to the result of actual working compared with working plan prescriptions to the end of March 1939 :—

plans and the results of actual working up to 31st March 1939.

Results of working.									
					Yield.		Regeneration.		
System.	Coupes.	Area in acres.	Agency of exploitation.	Price obtained.	Timber.	Fuel.	Method and coupe area.	Cost.	Remarks.
(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
				RS. A. P.	C.F.T.	C.F.T.		RS. A. P.	
Range.									
As in column (5).	I to V * I to X and I to V.	748	Contract and departmental.	5,818 10 0	78,707	..	Rab sowings, I to IX.	1,609 13 0	*These coupes were felled twice. First preliminary felling there after clear-felling.
....	..	82	..	396 6 0	3,469	..	Rab sowings I to IV.	435 14 0	
....	I to IX ..	10,594	Contract ..	2,882 2 0	15,690	..	....	..	
....	I to III ..	16,435	Do. ..	1,900 0 0	..	..	....	..	
....	Do. ..	15,387	Do. ..	15,205 0 0	..	..	....	..	
....	Do. ..	16,954	..	10,123 0 0	..	..	....	..	
....	Do. ..	24,416	..	5,297 0 0	..	..	....	..	
As in column (4).	As in column (7).	..	..	12,958 0 0	15,198	..	....	..	
....	I to VII ..	478	Contract ..	1,117 0 0	8,468	..	....	..	
....	I to VIII ..	1,829	Do. ..	1,222 0 0	6,506	..	....	..	
Range.									
Same as column (4).	I to XIII *..	1,143	Contract ..	10,827 0 0	103,157	225,680	Rab sowings, V to XII, 894.	218 10 8	* The Chelama working plan expired in 1936 but the prescriptions are being followed. Only 10 coupes were prescribed in the plan.
....	Do. ..	1,523	..	11,710 12 0	143,941	149,100	Rab sowings, V, VI. VIII to XIII.	193 3 0	
Same as column (4).	I to IX ..	943	Departmental..	29,338 7 0	36,746	..	Rab sowings, IV, VI to VIII and X.	160 6 8	
Do. ..	Do. ..	434	Contract ..	6,922 4 0	70,865	20	Rab sowings, III to VIII.	261 3 6	
		Not worked.							
....	I to XIII *..	1,091	Departmental..	1,495 3 0	5,838	..	....	..	
....	Do. ..	1,019	Do. ..	4,558 4 0	10,586	..	....	..	
....	I to III ..	2,500	Contract ..	11,761 0 0	..	..	....	..	
....	Do. ..	2,242	Do. ..	5,697 0 0	..	..	....	..	
....	Do. ..	8,522	Do. ..	2,669 0 0	..	..	....	..	* These coupes of series I, II and III for 1938–39 were sold together for Rs. 900.
....	Do. ..	6,600	Do. ..	1,045 0 0	..	..	....	..	
....	Do. ..	8,220	Do. ..	1,360 0 0	..	..	....	..	
Range.									
....	I to IX ..	486	Contract ..	9,989 8 0	78,043	6,390	Rab sowings, I to VIII, 1,216.	239 14 0	
....	I to VII ..	384	Do. ..	4,833 0 0	40,345	7,490	Rab sowings, I to IV and VI, 642.	105 6 0	
....	I and II ..	103	Do. ..	227 8 0	7,666	19,600	Rab sowings, I and II, 90.	21 14 0	
....	I to III ..	20,650	Do. ..	3,625 0 0	..	..	....	..	
....	Do. ..	9,875	Do. ..	4,090 0 0	..	..	....	..	
....	Do. ..	10,202	Do. ..	10,500 0 0	..	..	....	..	
Same as column (4).	I to IV ..	317	Do. .	393 8 0	840	24,300	Rab sowings, I to IV, 350.	44 9 0	

Comparative statement showing the prescriptions of working plans

Working circle.	Working plan.	Area of working circle in acres.	Prescription of the working plan. System of working.	Rotation.	Felling Cycle.	Series.	Years of working.	Area in acres.	Regeneration measures.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
									Giddalur
Simple Coppice Working Circle.	Giddalur-Gundlakamma Working Plan.	8,486	Simple coppice leaving valuable fruit bearing trees, such as *Strychnos, nuxvomica, Feronea* and *elephantum*.	30 years ..	..	Diguvametta.	1930–39.	690	Dibbling of seeds of Yepi, Chirumanu, Nallamaddi, Billudu and Mushti.
						Kothakote.	Do.	652	Do.
						Sudulabodu.	Do.	1,044	Do.
Agricultural Implements Working Circle.	Do.	28,828	Selection coppice, retaining advance growth of specified species and below stipulated girths.	Do.	..	Tadutla ..	Do.	969	Dibbling the seeds of Nallamaddi, Yegi, etc.
						Barlakunta.	Do.	930	Do.
						Mallalamma.	Do.	1,812	Do.
						Chintalapalle.	Do.	1,052	Do.
						Yerraguntla.	Do.	1,086	Do.
						Veerareddikunta.	Do.	1,012	Do.
									Ganjivaripalle
Selection Working Circle.	Kurnool East plan.	39,371 (part in Turimella range).	Selection felling of Yepi of and over 42" in girth over bark at chest height and of other species of and over 18" in girth.	..	10 years ..	Telugurayanicheruvu.	1928–29 to 1938–39.	12,928	..
						Regumanipenta.	Do.	4,288	..
						Guttalachenu.	Do.	19,904	..
....	Addendum to Kurnool East plan.	7,000	Selection felling of Yegi trees of and above 42" in girth at breast height.	..	3 years ..	Chinnarutla Yegi series.	Do.	7,000	..
Bamboo Working Circle.	Kurnool East plan.	158,758 (parts in Dornal and Turimella ranges).	Selection thinnings.	..	Do. ..	Nekkanti.	Do.	23,000	..
									Turimella
Timber Improvement Working Circle.	Do.	5,809 (part in Dornal range).	Clear-felling ..	40 years ..	..	Maddipenta.	1928–29 to 1938–39.	310	Rab with valuable species.
Softwood Selection Working Circle.	Do.	85,338 (part in Dornal range).	Selection felling of softwood species of and above 42" in girth over bark at the base.	..	10 years ..	Turimella Range of soft wood Felling Series.	Do.	73,470	..
Selection Working Circle.	Do.	39,371 (part in Ganjivaripalle range).	Selection felling of Yepi trees above 42" in girth at breast height and other species 18" in girth.	..	Do. ..	Papinenipalli.	Do.	2,251	..
Fuel Working Circle.	Do.	16,108 (part is in Markapur range).	Simple coppice ..	30 years ..	..	Boggulasorava.	Do.	100	Rab sowings.
						Somidevipalli.	Do.	100	Do.
						Tallapoya.	Do.	300	Do.
						Tumalapenta.	Do.	560	Do.
						Utla ..	Do.	300	Do.
						Vemulakunta	Do.	900	Do.
						Bircnimula.	Do.	300	Do.
						Bollupalle.	Do.	400	Do.
						Guvvalakonda.	Do.	300	Do.
						Lingamayakuruva.	Do.	250	Do.
						Malamanukunta.	Do.	400	Do.
						Uppukonthipaya.	Do.	400	Do.
Bamboo Working Circle.	Do.	158,758 (parts in Dornal and Ganjivaripalli ranges).	Selection thinnings of clumps.	3 years ..	..	Maddipenta.	Do.	14,849	..
						Turimella plains series.	1935–36 to 1938–39.	31,424	..
									Markapur
Fuel Working Circle.	Do.	16,108 part in Turimella range.	Simple coppice ..	30 years ..	..	Magatur ..	1928–29 to 1938–39.	270	..
						Regatikunta.	Do.	290	..
Bamboo Working Circle.	Do.	35,190	Selection thinnings of clumps.	..	3 years ..	Markapur Range Felling Series.	1928–29, 1929–30 and 1936–37.	35,190	..

and the results of actual working up to 31st March **1939—cont.**

Results of working.									
					Yield.		Regeneration.		Remarks.
System. (11)	Coupes. (12)	Area in acres. (13)	Agency of exploitation. (14)	Price obtained. (15) RS A. P.	Timber (16) C.F.L.	Fuel. (17) C.F.L.	Method and coupe, area. (18)	Cost. (19) RS. A. P.	(20)
Range—cont. As in column (4).	I to IV and VI.	339	Contract ..	638 6 0	437	48,620	Rab sowings, II to IV, 115.	28 14 0	
....	I to IV ..	318	..	482 8 0	60	29,920	Rab sowings, I and II, 131.	27 13 0	
As it is a reserve series no demand ; hence not sold.									
As in column (4)..	I to VI ..	538	Contract ..	1,417 10 0	1,929	94,010	....	..	
Do. ..	I ..	73	Do. ..	175 0 0	209	8,770	....	..	
Do. ..	I to VI ..	1,118	Do. ..	3,574 2 0	1,914*	140,084	Rab sowings I to IV.	23 12 0	*Yield from coupe VI not included.
Do. ..	I to VIII ..	909	Do. ..	3,338 14 0	36,493	227,010	....	..	
Do. ..	I to VII ..	881	Do. ..	1,532 10 0	45,688	63,940	....	..	
Do. ..	I to VI ..	736	Do. ..	1,703 14 0	4,478	130,040	....	..	
Range.	I to XI, and I	12,410	..	1,208 10 0	2,131	..	....	..	
....	Do. ..	4,253	..	431 15 0	1,624	..	....	..	
....	Do. ..	21,779	..	1,330 0 0	1,236	..	....	..	
....	I to III ..	7,000	..	937 6 0	827	..	....	..	
....	I to III ..	..	Departmental.	1,176 8 0	..	..	....	..	
Range.	I to IV ..	171	Contract ..	1,427 0 0	13,326	..	Rab sowings, I to V.	428 14 8	
....	I, II, V to X.	54,826	Contract and departmental.	3,731 4 0	25,801	..	....	..	
....	I to VIII ..	1,730	Departmental.	1,597 10 0	4,362	..	....	..	
As in column (4)..	I to III ..	42	Contract ..	606 0 0	2,898	..	....	..	
Do. ..	XI, XII and XIII.	162	Do. ..	440 12 0	..	12,088	Rab sowings, I, 40 patches.	16 13 0	
Do. ..	I, II and IV.	59	Do. ..	246 9 0	..	7,257	....	..	
Do. ..	V to XII ..	446	Do. ..	3,261 8 0	2,075	212,102	Rab sowings, IX and XI.	36 7 6	
Do. ..	I to VIII ..	253	Do. ..	1,177 9 0	..	104,984	Rab sowings VIII.	22 2 0	
Do. ..	I to VI ..	503	Do. ..	2,441 8 0	..	135,216	Rab sowings, IV and VI.	52 3 0	
Do. ..	.. ..	..	..	..	..	..	....	..	
Do. ..	I	..	..	100 0 0	..		....	..	
Do. ..	I to IV ..	131	Contract ..	380 6 0	..	25,725	Rab sowing, IV ..	8 13 0	
Do. ..	I	32	Do. ..	116 0 0		1,800	....	..	
Do. ..	I	40	Do. ..	160 0 0		200	....	..	
Do. ..	I	..	..	90 0 0	..		....	..	Leased out but not worked.
....	I to III ..	..	Contract ..	9,960 15 0	..	..	....	..	
....	Do. ..	..	..	1,760 0 0	..	..	....	..	
Range.	I to IV ..	88	Contract ..	420 10 0	..	30,152	....	..	
....	Do. ..	68	Do. ..	180 1 0	..	26,876	Rab II and IV, 338.	..	
....	I to III ..	35,190	..	91 4 0	..	..	....		

237. *Revised working plan.*—The revision of Mr. Sarma's Working Plan was undertaken by the author in 1937 and the working plan report was submitted to the Chief Conservator of Forests in 1938, who sanctioned it tentatively for one year from April 1939, pending rewriting of the working plan for the new Kurnool East division consequent on the abolition of Kurnool South and the addition of three ranges to Kurnool East. The two ranges of Gundlakamma and Giddalur continued to work under the prescriptions of Mr. Sundaram's Working Plan during 1939–40. The following statement shows the results of actual working in 1939–40 :—

Serial number and working circle. (1)	Series. (2)	Coupe number. (3)	Area in acres. (4)	Price obtained. (5) RS.	A.
	Author's plan.				
1 Timber working circle	Mogilutala	XI	55	935	0
2 Small timber working circle	Peddachama	I }			
	Chintala	I }			
	Nallaguntla	I }	Not yet worked.		
	Telugurayanicheruvu	I }			
	Guttalachenu	I }			
3 Fuel working circle	Mallalamma	VII	118	619	8
4 Manure Leaf working circle	Tadivaripalli	I }	Not sold.		
	Mallapuram	I }			
5 Softwood working circle	Chinnamantrala	I	1,639	Not sold.	
6 Bamboo working circle	Chinnamantrala	III }			
	Peddachama	III }	..	1,200	0
	Peddamantrala	III }			
	Chilakacherla	III }			
	Nekkanti	III }			
	Chinnarutala	III }	Not worked.		
	Bommilingam	III }			
	Mr. Sarma's plan for Turimella.				
1 Timber improvement working circle	Maddipenta	V	12	60	0
2 Yepi Selection working circle	Papinenipalli	IX	..	65	0
3 Fuel working circle	Tummalapenta	XIII	54	148	8
	Guvvalakonda	V	39	92	10
	Vemulakunta	VI	22	66	0
4 Bamboo working circle	Maddipenta	III	..	1,575	0
	Turimella plains Lokki	III	..	310	0
5 Softwood working circle	Turimella Range	I	..	22	0
	Mr. Sundaram's plan.				
1 Clear felling working circle	Sandrapodu	X	54	621	0
	Iskagundam	X	39	780	0
2 Timber working circle	Vedurlakonda	XIV	88	880	0
3 Selection cum improvement working circle.	Gundlakamma	X	95	1,805	0
4 Agricultural Implements working circle.	Tadutla	VII	117	263	4
	Chintalapalli	IX	153	459	0
5 Fuel working circle	Diguvametta	VII	54	67	8
6 Bamboo working circle	Bodi	I	9,364	900	0
	Othumadugu	I	3,289	145	0
	Guvvalapenta	I	1,770	1,200	0
	Tunnel	II	864	970	0
	Malakondapenta	II	636	1,060	0
	Series I	I	2,490 }		
	,, II	I	1,120 }	460	0
	,, III	I	1,920 }		

238. Consequent on the transfer of Yerragondapalam range to Guntur division and part of Kanigiri range to Nellore division, the relevant portions of the working plan were communicated to the Working Plan Officer, Guntur, for incorporation in the new working plan for Guntur and to the District Forest Officer, Nellore, for action. Complete sets of stockmaps were also supplied.

SECTION 3.—SPECIAL WORKS OF IMPROVEMENT UNDERTAKEN.

239. *Teak plantations.*—Planting up large areas in the vicinity of Chenchugudems at Chinnamantrala, Peddamantrala, Peddachama, Telugurayanicheruvu and Maddipenta with teak and other species was undertaken between the years 1904 and 1914 primarily as a measure of providing work for the Chenchus and incidentally, for the amelioration of the forest itself on the hill slopes, and also for the conservation of water-supply to the plains. The total area dealt with was about 330 acres, and the cost of the plantations came to the very large total of Rs. 64,640, which works out to about Rs. 200 per acre. In almost all the localities the plantations have been a failure, chiefly due to inadequate rainfall and inhospitable soil conditions, and, secondarily due to inexperience in planting operations. Besides, many trees and bamboo clumps were left behind in the planted areas to the detriment of seedling development. The remnants of the teak plantations are in evidence in scattered patches in the localities of Peddamantrala, Peddachama and Maddipenta. Individual trees under favourable soil conditions have produced satisfactory results but it is doubtful if the plantations are worth retention after an age of 40 years as it is likely to result in loss of increment. The felling of these plantations should be considered at the time of the revision of this plan.

The following statement gives particulars of the plantations :—

Locality. (1)	Area in acres. (2)	Height of dominant trees. (3)	Girth of dominant trees in inches. (4)	Thinnings done in. (5)
Peddamantrala	13·75	72	42	1926, 1937.
Peddachama	46·75	63	39	1924, 1931, 1932.

Nothing remains of the plantation at Telugurayanicheruvu except a few well grown sandal trees, and at Chinnamantrala a few straggling teak persist.

240. *Bunding jungle streams.*—An over-ambitious attempt at bunding up forest streams with a view to retaining moisture in the soil for a longer period and sowing seeds of evergreen species along the bunds on a 20-year programme was undertaken in 1908 but the effort was short-lived.

241. *Sandal.*—In 1865, it has been recorded that sandal was "growing in abundance in the northern portions of the hills, commencing at Peddacheruvu and continuing to the southern banks of the Kistna river, a length of about 20 miles with a breadth of about 10 miles. As might have been expected the ripe trees have all been felled, having, as I think, been smuggled off yearly by pilgrims and others who frequent the Sreesailam pagoda . . . I cut some trees one foot circumference which produced only ¼ inch of wood giving smell. Not one ripe tree can be found in the whole of the forest."

Natural sandal is found scattered in the north-eastern corner of Dornal range beyond Thummalabailu adjoining the common boundary between Kurnool West and this division. This area is an extension of the Peddacheruvu plateau referred to above. Enumerations made in 1926–27 revealed the following results :—

Trees above 12 inches in girth	108	Seedlings	292
Trees above 6 inches to 12 inches	504		
Trees below 6 inches	216	Total ..	1,120

The conditions on the Morricheruvu plateau would appear suitable for sandal but the existing sandal trees do not show signs of advancement. Some adverse factor, probably the shaly subsoil which drains off surface moisture and is obstructive to the establishment of haustorial connections with host trees, or annual fires, is keeping back the natural spread of sandal.

242. *Sandal propagation centres.*—The creation and maintenance of one-acre sandal propagation centres in each Forest Guard's beat and Forester's section was prescribed under Mr. Sarma's Working Plan. Attempts at raising the centres were perfunctory in many cases. The work was undertaken on ill-chosen sites and under conditions glaringly inhospitable to sandal with the result that the plots have been mostly a failure with the exception of a few on the Nekkanti and Guttalachenu plateaux where the saplings hold on promise. The following statement shows the distribution of sandal plots :—

Beat. (1)	Number of plots. (2)	Number of seedlings existing. (3)	Beat. (1)	Number of plots. (2)	Number of seedlings existing. (3)
		Dornal Range.			
Chilakacherla	10	100	Peddamantrala	10	51
Cherlopalli	10	44	Chintala	8	42
Chinnamantrala	7	88	Edavalu	5	5
Peddachama	9	121	Bommalapuram	10	9
Peddachama inside plantation	..	308			
		Ganjivaripalli Range.			
Kolukula	10	143	Telugurayanicheruvu	10	477
Nekkanti	10	107	Ganjivaripalli	10	145
Regumanipenta	5	7	Guttalachenu	20	2,318
		Markapur Range.			
Kalanutala	10	115	Nagalavaram	10	29
Gundamcherla	10	10	Donakonda	10	61
Gottipadya	10	7	Bommilingam	10	26
Magatur	10	17			

Similar prescriptions were made under Mr. Sundaram's Working Plan and the results of the operations are recorded below :—

Beat.	Number of plots.	Number of seedlings existing.	Beat.	Number of plots.	Number of seedlings existing.
		Gundlakamma Range.			
Malakondapenta, West	4	20	Diguvametta	4	36
Malakondapenta, East	4	27	Iskagundam	4	22
Tunnel	4	23	Obilesunipenta	4	29
		Turimella Range.			
Krishnapuram	4	35	Bollepalli	1	5
Racherla	2	7	Maddipenta	2	2
Pullalacheruvu	9	162	Papinenipalli	5	37
Ambavaram	3	18	Turimella	4	28
Arvitukota	3	6	Velagalapaya	6	44
		Giddalur Range.			
Sandrapodu	1	6	Uyyalvada	[illegible]	1
Kothakota	1	10	Bodi	3	5
Nallaguntla	4	21			

Sandal exists in and around Diguvametta over an area of 154 acres probably introduced in 1910 or so. The species is thriving and is intrusive into the adjoining unreserves.

243. *Fire protection.*—Annual forest fires have been a serious problem in the early years of forest administration and the first suggestion to protect small carefully selected areas of forest by burning belts round them and clearing roads through them besides having a staff to watch during the fire season, emanated from Gamble in 1887. By 1893 the original proposals for fire protection were given effect to by fire-tracing the West Veligonda forests, which was the only block reserved at the time, and an improvement was made by clearing 6 feet wide parallel lines at any convenient distance apart and burning all the inflammable growth between them, as this was considered to be cheap and effective. An extract from the Inspection Note by A. W. Peet, dated 31st July 1896, on the subject of the system of fire protection and the difficulties attendant on it, is reproduced below: " Fire protection as a general measure is impossible until we have more control over the forest and its inhabitants. All we can do is to try to protect small blocks, where operations have been going on and keep open our communications; for I believe the keeping open of communications will not only act as a deterrent, because permitting of rapid inspection, but will remove one danger at all events, namely, the temptation to fire the grass just to clear the paths. However, as I advised before, I think we might save more of the forest than we do now, if we ourselves systematically fired some of the more important grazing areas, to remove another temptation; for if we do not fire these tracts the graziers will."

244. *Early system of fire protection.*—Till 1905 attempts at fire protection consisted in burning narrow and cutcha lines which could not stop the sweeping fires. Mr. Cox recommended that the lines should be at least 60 to 100 feet wide, absolutely cleared of all vegetation, and should run along a gentle gradient so that fire patrols could easily get along them. This proposal was accepted and an improvement was made by laying out the lines with a gradient not exceeding 1 in 20 to facilitate inspection purposes. Pentas were considered a perpetual source of danger from fire. In conformity with the orders of the Board of Revenue and the Government, it was suggested to burn the pentas and a certain area round them at the beginning of the hot weather or the end of the cold, in order to prevent the graziers from doing so later in the season when the chances of conflagration are greater. Chenchus were appointed as fire watchers. The following is a list of fire lines cut during the period.

List of fire lines and other lines cut in Kurnool East Division in the past.

Serial number and name of line. (1)	Length. (2) M. F. CH.	Width. (3) FEET.	Remarks. (4)
Fire lines.			
1 Jadalacheruvu Komativanibhavi Devaraja Kuruva line.	9 0 0	60	
2 South district boundary lines from Pagapade to Jadalacheruvu.	6 4 0	60	
3 West district boundary line in Maddipentagudem lines.	7 0 0	25–30	
4 Chinnamantrala road line	8 2 0	60	
5 Ipplabayalu line	..	..	Is not being maintained.
6 Pethalapaya line	..	..	Do.
7 Plantation lines in Maddipentagudem	1 6 0	10	Serves as a plantation line.
8 Narlapaya line	0 4 0	40	Fire line.
9 Maddipenta road line	11 2 0	30	Do.
10 Exterior boundary lines	160 7 0	12	
11 Sim's line between Main Cumbum Reserve Forest and Extension.	9 0 0	25–30	
12 Titta Ruraka fire line	1 2 0	30–40	Do.
13 Naralapaya-Nagayyakunta line	12 0 0	60	Old range boundary between Gudem and Markapur.
14 West district boundary line in Chinnamantrala-gudem.	6 2 0	60	Boundary between east and west.
15 West district boundary line in Peddamantrala.	2 6 0	60	Do.
16 Pillalagathu-Nallaguntlakuduba line	16 6 0	60	
17 West district boundary line in Peddachamagu-dem.	4 4 0	..	Boundary between east and west.
18 Pandikayya-Thummalabailu line	4 0 0	60	Now under Kurnool West Division.
19 Chintala-Elukuntapaya line	3 0 0	60	
20 Cherlopalli slope line	5 2 0	60	
21 Thummalabailu-Pamudona-Irrikayalapenta line.	4 4 0	60	
22 Puttakuruva line	4 0 0	60	
23 Irrikayalapenta-Peddamantrala line	4 0 0	60	
24 Irrikayalapenta-Gorankuladela line	7 0 0	60	
25 Pedda-arutla-Elumaleru line	7 0 0	60	
26 Elumaleru-Bhuthotipenta line	7 0 0	60	
27 Bhuthotipenta-Jadalpenta line	8 0 0	60	
28 The 1,800 feet line	5 6 0	60	
29 Sandal area line	1 0 0	60	Line separating the sandal area from adjacent reserve.
30 Muthyalammakonda line	12 4 0	60	Range boundary between Turimella-Markapur and Dornal.
31 Jarrikonda line	13 6 0	60	
32 Marripenta-Nekkanti	15 0 0	60	
33 Chellaprodutha to the Range boundary line.	4 0 0	60	
34 Ghat penta line	3 0 0	60	
35 Exterior boundary lines	56 6 4	60	Lines separating the areas open to grazing from those closed to grazing.

Serial number and name of line. (1)	Length. (2) M. F. CH.	Width. (3) FEET.	Remarks. (4)
Fire lines—cont.			
36 Interior fire line	8 5 0	60	
37 Common boundary line	1 0 0	60	
38 Nuthibhavi-Bommalingam fire line	3 0 0	60	
39 Tekulapenta line	..	..	
40 Polikimanibanda line	..	..	
41 South railway guide line	..	..	
42 North railway guide line	..	..	
43 Mokalakuruva line	..	..	
44 Vedurlakonda line	..	..	
45 Akavidzokkalu line	..	..	
46 Paler dam-Kuruva line	..	..	
47 East outer line	..	..	
48 Regimanipenta line	..	..	
49 Guvvalapenta line	..	..	
50 Chitrangi Neradugundam line	..	..	
51 South outer boundary line	..	..	
52 Rakasipenta line	..	..	
53 South catchment area line	..	..	
54 Vontiveerunipenta line	..	..	
55 Medijari line	..	..	
56 Veyyavallachelika line	..	..	
57 Perikalapenta line	..	..	
58 Uriniarava line	..	..	
59 North catchment area line	..	..	
60 Diguvametta-Malakondapenta road line from 2nd mile up to Malakondapenta.	..	..	
61 Malakondapenta-Iskagundam road line	..	..	
62 Iskagundam-G.B.M. road line	..	..	
63 Iskagundam-Obulesanipenta road line	..	..	
64 Exterior lines	..	..	
65 Vottivagu fire line	..	..	
66 Bodi fire line	..	..	
Other lines.			
67 Chinnarutla road line	6 2 0	60	This also prevents the road from being damaged by overhanging branches during rains.
68 Kortikanama-Pachikalva line	5 0 0	40	
69 Yetipaya line	2 0 0	40	Line cut for construction of a road from Chinnamantrala to Mantralakanama.
70 Sandal area line-Chinnarutla-Sikharam	2 6 0	60	These are the lines cut to divide the sandal area into a number of blocks and also to help rigid fire protection of the same.
71 Chinnarutla-Pamudona line	4 2 0	60	
72 Pulicheruvu-Pandikayya	3 7 0	60	
73 Sikharam-Pulicheruvu	4 0 0	60	
74 Thummalabailu to West district boundary line.	2 4 0	60	
75 Mogilutla line	2 2 0	40	
76 Chinnamantrala plantation lines	3 2 0	20	To demarcate one year's coupe from next year's.
77 Rollapenta road line	7 0 0	60	Thirty feet on either side to serve as fire lines.
78 Pecheruvu road line	3 4 0	60	The line for the road from Pecheruvu to Rollapenta.
79 Nallamadugu-Kuduba lines	4 0 0	30	Since converted as road.
80 Peddamantrala plantations line	3 0 0	20	To demarcate one year's coupe from next year's.
81 Thummalabailu-Chintala road line	5 0 0	30	Since converted as road.
82 Dornal-Kuduba road line	8 0 0	30	Do.
83 Plantation lines in Peddachamagudems	3 0 0	20	To demarcate one year's area from next year's.
84 Thalakunta line	3 4 0	60	Old 60′ line, now forms the boundary between reserve and Panchayat block.
85 Thappal line	3 0 0	60	Utility not known.
86 Plantation lines in Telugurayanicheruvu-gudem.	1 6 0	60	To demarcate one year's area from next year's.
87 South grazing line	20 0 0	60	In Monicheruvu Range separating the areas open to grazing from those closed to grazing.
88 North grazing line	30 0 0	60	

245. *Early burning.*—The system of fire tracing was abandoned, and early burning, as a measure of fire protection, was introduced in 1920. The merits of early burning have been much discussed in various divisions and its limitations are now well recognized. The method as followed in practice has only touched the fringe of the problem, as the cost of the operation is prohibitive, if it is to be efficient, and the staff is limited. The so-called early burning has been but an euphemism for the late variety and all burning, accidental, wilful and incendiary, have been readily ascribed to early burning.

246. *Fire protection under Mr. Sarma's plan.*—Under Mr. Sarma's Working Plan the following prescriptions were made for fire protection :—

(*a*) In type C (timber) forests, about 106 square miles, a thorough early burning was to be done by the subordinates.

(*b*) In type B (plateau) forests, about 130 square miles, early burning of strips 5 chains wide on either side of roads, bridle-paths, foot-paths and other lines was to be done, and early burning 2 miles square all round each camp and Chenchu gudem was also to be done.

(*c*) In type A (poor) forest, which occupy nearly two-thirds of the division, no fire protection was prescribed.

247. *Fire protection under Mr. Sundaram's plan.*—Under Mr. Sundaram's Working Plan the Selection *cum* Improvement Felling and Clearfelling Working Circles in timber and pole areas were to be early burnt, as well as, annual coupes in them for a period of five years when they were to receive rigid fire protection. No other measure of fire protection was prescribed. The district boundary between Kurnool and Nellore, passing through the reserves, was to be annually cleared and fire traced.

248. The following statement shows the expenditure on fire protection in the past :—

Year.	Dornal Range.	Gundla-kamma Range.	Giddalur Range.	Turimella Range.	Ganjivari-palli Range.	Markapur Range.	Total cost.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	RS. A.	RS. A.	RS. A.	RS. A.	RS. A.		RS. A.
1928–29	193 14	195 7	68 0	56 4	347 2	..	860 11
1929–30	418 6	173 15	60 9	46 4	314 14	..	1,014 0
1930–31	420 6	150 0	90 10	112 12	268 10	..	1,042 6
1931–32	396 4	77 12	70 5	53 7	214 14	..	812 10
1932–33	115 4	244 15	57 9	56 0	219 2	..	692 14
1933–34	274 4	199 3	92 12	67 12	235 8	..	869 7
1934–35	98 0	100 0	63 14	17 7	125 4	..	404 9
1935–36	167 8	189 15	77 10	86 0	181 8	..	702 9
1936–37	200 4	114 8	51 13	89 0	139 12	..	595 5
1937–38	198 4	139 3	56 1	46 0	139 14	..	579 6
1938–39	176 0	121 10	60 10	58 12	29 3	..	446 3

249. *Roads and buildings.*—The working plans to which reference has been made in the foregoing paragraphs laid down no definite programme of works of improvement to be undertaken and generally left untouched, or dealt with casually, measures of regeneration. Little was done in the distant past in the direction of silviculture but considerable improvement was made in the development of forest areas by constructing roads and buildings. A fillip was given in 1913 to constructional works and actually a definite programme of such works was drawn up in 1916.

Detailed lists of all departmental roads, buildings and wells are given below.

250. *List of roads and bridle paths.*

Serial number and name of the road.	Year of construction.	Capital cost.	Length.	Width.	Nature of the road.
(1)	(2)	(3)	(4)	(5)	(6)
		RS.	M. F.	FEET.	
Dornal Range.					
1 Rollapenta-Motlamallayya Ghat road (Mantralakanama).	1910–13 ..	9,635	8 3	30	Metalled and gravelled.
2 Dornal-Peddachama road via Chintala.	1913–14 ..	9,000	15 6	12	Gravelled and earthen.
3 Maddipenta-Chinnamantrala road.	1911–12 ..	3,000	7 0	12	Earthen.
4 Chintala-Tummalabailu road ..	1915–16 ..	2,450	5 0	12	Do.
5 Peddachama-Nallamadugula penta road.	1914–15 ..	790	8 0	12	Do.
6 Chinnamantrala-Nallamadugula penta road.	1920–21 ..	1,300	4 6	12	Do.
7 Approac hroad to Chintala rest-house.	1915–16 ..	85	0 2	12	Do.
8 Approach road to Rollapenta rest-house.	Not known.		0 6	12	Do.
9 Approach road to Eguvacherlopalli rest-house.	Do.		1 3	12	Do.
10 Cherlopalli-Chinnamantrala cart-track.	1918–19 ..	200	6 0	8	Do.
11 Chinnamantrala-Peddamantrala cart-track via Nallaguntla.	1917–18 ..	949	6 6	12	Do.
12 Thummalabailu-Pecheruvu cart-track.	1916–17 ..	350	4 0	12	Do.
13 Cherlopalli-Kalanutla cart-track ..	1921 24	2,340	7 0	12	Do.
14 Cherlopalli-Peddachama bridle-path.	1914–15 } 1917–18 }	2,262	7 0	4	Do.
15 Chintala-Peddamantrala bridle-path.	1917–18 ..	2,100	7 0	4	Do.
16 Peddachama-Thummalabailu bridle-path.	1920–21 ..	120	0 7	5	Do.
17 Chintala-Telugurayanicheruvu bridle path.	1913–14 ..	1,000	4 3	4	Do.
18 Chintala-Devaludu bridle-path ..	1913–14 ..	500	1 6	4	Do.
Gundlakamma Range.					
19 Diguvametta-Malakondapenta road.	1912–13 ..	18,266	8 0	12	Partly metalled.
20 Malakondapenta-Iskagundam road.	1911–12 ..	2,378	9 0	12	Unmetalled.
21 Iskagundam-Gundlabrahmeswaram road.	1924 ..	938	4 0	12	Do.
22 Parikalapenta-Obulesunipenta road.	1921–22 ..	2,396	4 1	9	Do.
23 Obulesunipenta-Maddipenta bridle-path.	1914–15 ..	750	4 4	6	Do.
Giddalur Range.					
24 Diguvametta-Sandrapodu road ..	1924–25 ..	6,652	7 5	12 16 in plains.	Do.
25 Kothakota-Papiledu cart-track ..	Not known.		2 3	12	Do.

Serial number and name of the road. (1)	Year of construction. (2)	Capital cost. (3)	Length. (4)		Width (5)	Nature of the road. (6)
	Ganjivaripalli Range.					
		RS.	M.	F.	FEET.	
26 Ganjivaripalli village to forest rest house cart road.	1928–29 ..	137	0	4	12	Earthen.
27 Ganjivaripalli-Telugurayanicheruvu road.	1918–19 .. } 1923–24 .. }	1,450	11	0	12	Do.
28 Ganjivaripalli-Regumanipenta-Narthadikala ghat road.	1917–18 ..	3,500	13	0	12	Do.
29 Narthadikala-Guttalachenu road ..	1921–22 ..	1,687	6	2	12	Do.
30 Telugurayanicheruvu-Gudimetta bridle path.	1914–15 ..	590	6	0	4	Do.
31 Nekkanti-Gudimetta bridle path ..	1915–16 ..	118	6	0	4	Do.
32 Nekkanti-Guttalachenu bridle path.	1924–25 ..	60	5	0	4	Do.
33 Telugurayanicheruvu-Chintala bridle path.	1913–14 ..	1,000	4	0	4	Do.
34 Chinnarutla-Nekkanti bridle path.	1914–15 ..	847	10	0	4	Do.
35 Telugurayanicheruvu-Devaludu bridle path via Bhutodipenta.	1915–16 ..	1,170	8	0	4	Do.
	Turimella Range.					
36 Aravetikota-Lokki road	1915–17 ..	991	4	4	12	Earthen motorable.
37 Adutla-Pogapad-Papinenipalli road.	1911–12 ..	3,000	9	0	12	Do.
38 Pogapad-Maddipenta-Chinnamantrala road.	1911–12 ..	1,500	11	3	12	Do.
39 Malakondapenta-Jayaramapuram road or Thummalapenta road or Karlakunta road.	1914–15 ..	489	2	0	8	Do.
40 Maddipenta branch road		Not known.				
	Markapur Range.					
41 Regatikunta-Magatur road via Katam Raju penta.	1919–20 ..	800	6	7	12	Earthen.

251. *List of buildings.*

Name of place. (1)	Name of building. (2)	Year of construction. (3)	Cost. (4)
	Dornal Range.		RS.
1 Dornal	Rest house	1911–12	2,089
	Out-houses	1911–12	946
	Kitchen	1911–12	355
	Range Officer's quarters	1909–10	2,256
	Godowns and stables	1911–12	336
	Range office	1909–10	1,600
	Latrine	1930–31	27
	Range Clerk's quarters	1909–10	1,590
2 Peddachama ..	Rest house and out-houses	1908–09	753
	Stables	1927–28	22
	Forester's quarters and depot	1910–11	1,209
	Subordinates' lines	1913–14	1,900
	Chenchu school shed	1926–27	35
	Kitchen	1927–28	17
3 Chintala ..	Rest house	1914–15	272
	Out-houses	1914–15	157
	Stables	1933–34	38
	Forester's quarters and depot	1917–18	1,736
	Subordinates' lines of 4 rooms	1927–28	185
	Chenchu school shed	1927–28	39
	Kitchen	1927–28	14
4 Chinnamantrala	Rest house	1908–09	717
	Out houses	1908–09	52
	Stables	1927–28	22
	Foresters' quarters and depot	1913–14	1,465
	Subordinates' lines	1913–14	1,954
	Chenchu school shed	1927–28	38
	Kitchen	1927–28	17
5 Peddamantrala.	Rest house	1907–08 }	856
	Out-houses and kitchen	1907–08 }	
	Stables	1932–33	36
	Forester's quarters and depot	1912–13	1,500
	Subordinates' lines of 4 rooms	1913–14	1,900
	Chenchu school shed	1928–29	44
	Kitchen shed	1927–28	17
6 Eguvacherlopalli.	Rest house	1919–20	3,409
	Godowns and stables	1922–23	1,094
	Rest house for Range Officer	1914–15	2,120
	Latrine	1917–18	50
	Forester's quarters	1919–20	994
	Forest Guards' quarters	1919–20	659
7 Rollapenta ..	Rest house	1908–09	1,103
	Out-houses	1928–29	553
8 Mogilutla ..	Inspection shed	1937–38	..
	Kitchen shed and stables	1937–38	..
9 Thummalabailu.	Inspection shed	1927–28	160
	Kitchen shed	1928–29	33
	Stables	1928–29	30
10 Chilakacherla ..	Chenchu school shed	1927–28	25
	Kitchen shed	1927–28	18
	Chenchu school masters' shed	1926–27	47
	Gundlakamma Range.		
11 Diguvametta ..	Rest house	1901	1,635
	Out-houses	1921–22	300
	Stables	1921–22	100

Name of place. (1)	Name of building. (2)	Year of construction. (3)	Cost. (4)	
	Gundlakamma Range—cont.		RS.	
11 Diguvametta—*cont.*	Deputy Ranger's quarters	1907	2,710	For camping subordinates.
	Subordinates' quarters	1912	1,606	
	Depot buildings	1907–08	2,393	
	Store room	1907	399	
	Shed for storing timber	1926	314	
12 Tunnel	Rest house	1906–07	2,200	
	Out-houses	1906–07	960	
13 Malakondapenta.	Rest house	1906	548	
	Kitchen	1913	200	
	Subordinates' quarters, 2 blocks	1912–13	5,390	
14 Iskagundam	Rest house	1917	2,099	
	Kitchen	1917	135	
	Subordinates' quarters	1929–30	2,487	
	Inspection shed for Range Officer	1926	789	
15 Obulesunipenta	Rest house	1923	2,264	Reconstructed in 1938.
	Kitchen shed	1923	1,199	
	Stables and motor shed	1923	100	
	Giddalur Range.			
16 Giddalur	Giddalur Range Officer's quarters	1910–11	4,139	
	Gundlakamma Range Officer's quarters	1912	4,179	
	Stables for above quarters	1928–29	210	
	Giddalur Range office	1912	1,918	
	Gundlakamma Range office	1912	1,918	
	Latrines for above	1912–13	810	
17 Sandrapodu	Rest house	1907–08	750	Major repairs in 1939 due.
	Out-houses	1908–09	105	
	Stables	1927–28	105	
18 Sanjivaraopet	Rest house, small building	1935–36	1,746	
	Ganjivaripalli Range.			
19 Ganjivaripalli	Rest house	1905–09	1,018 (with out-houses)	
	Out-houses	1905–09		
	Range office and Range Officer's quarters.	1930–31	4,157 (with out-houses)	
	Out-houses	1930–31		
	Latrine	1932–33	51	
	Range Clerk's quarters	1930–31	1,044	
	Latrine	1932–33	51	
	Subordinates' lines	1930–31	1,495	
	Latrine	1932–33	65	
20 Telugurayanicheruvu.	Rest house	1910–11	1,800	
	Out-houses	1910–11	350	
	Forester's quarters and depot	1910–11	247	
	Forest guards' sheds	1919–20	45	
	Chenchu school sheds	1927–28	27	
21 Guttalachenu	Rest house	1915–16	720	
	Out-houses	1915–16	170	
	Forester's quarters and depot	1916–17	1,700	
	Forest guards' sheds	1918	60	
22 Nekkanti	Rest house	1919–20	1,562	
	Out-houses	1924–25	292	
	Forest guards' shed	1924–25	40	
23 Chinnarutla	Inspection shed	1915–16	749	
24 Regumanipenta	Forest guards' shed	1933–34	50	
25 Palutla	Chenchu school shed	1926–27	59 (with teachers' shed)	
	Chenchu teachers' shed	1926–27		
	Turimella Range.			
26 Maddipenta	Forester's quarters and depot	1913–14	1,552	
	Subordinates' line	1913–14	1,900	
	Chenchu school shed	1915	240	
	Kitchen shed for above	1927–28	22	
27 Papinenipalli	Rest house	1892–93	460	
	Out-houses	1892–93	230	
	Forest depot building	1906–07	883	
	Depot shed	1906–07	619	
28 Velagalapaya	Depot building (used as forest guards' residence).	1920–21	290	
29 Lokki	Inspection shed	1912	704	
	Out-houses	1917–18	110	
30 Turimella	Range office	1911–12	1,600	
	Range Officer's quarters	1911–12	2,237	
	Out-houses	1913–14	420	
	Range Clerk's quarters	1929–30	740	
31 Jallivaripullalacheruvu.	Depot building	1905–07	883 (with watcher's shed)	District Board school is being held here.
	Depot watcher's shed	1905–07		
	Markapur Range.			
32 Markapur	Range Officer's quarters	1908–11	2,185	
	Out-houses and latrine	1909–10	922	
	Range office	1908–09	1,644	
33 Chintalamudipi	Chenchu school shed	1927–28	13	
	Kitchen shed	1927–28	20	
	Chenchu school master's shed	1927–28	41	
34 Kurnool	Quarters for the District Forest Officer, Kurnool East Division, kitchen, out-houses, stables.	1928	18,488	

252. *List of wells, tanks and springs.*

Description. (1)	Locality. (2)	Year of construction. (3)	Cost. (4)	Nature of water-supply. (5)	Use. (6)
			RS.		
		DORNAL RANGE.			
Wells.					
Draw well	Chinnamanthrala	1917–18	629	Wholesome, perennial.	By subordinates and gudem Chenchus.
Do.	Kollapenta	1917 18	196	Do.	Rest house.
Do.	Chintala	1922–23	439	Do.	Rest house and by subordinates and gudem Chenchus.
Do.	Mogalutla	1916–17	145	Do.	By coolies and camping officers.
Do.	Peddamantrala	1904	500	Do.	Rest house and by subordinates.
Do.	Dornal	1914–15	323	Do.	By Range officer and his headquarters staff.
Do.	Eguvacherlopalli	1927–28	400	Do.	By subordinates.
Do.	Chilakacherla	1918–19	330	Do.	By gudem Chenchus.
Do.	Arichelama spring	..	..	Do.	By cattle and passengers.
Step well	Devaludu	..	..	Do.	By cattle.
Do.	Thummalabailu	..	..	Do.	By Chenchus.
Tanks.					
Peddamantrala tank	Peddamantrala	..	..	Semi-perennial, six months.	By cattle and Chenchus.
Kuntas.					
Madigavari kunta	At 69/6 mile on Mantralakanama ghat road.	..	..	Semi-perennial, four months.	By cattle.
Pomula Bhavi kunta	In Markapur Reserve Forest near Thummalabailu Chenchu gudem.	..	..	Semi-perennial, eight months.	By cattle and Chenchus.
Marripalem kunta	In Markapur Reserve Forest near Marripalem gudem.	..	..	Do.	Do.
Thalakunta	In Markapur Reserve Forest close to E.N. Block VI-A.	..	..	Semi-perennial, six months.	By cattle.
Narlapaya kunta	In Cumbum Reserve Forest.	..	..	Do.	Do.
		GUNDLAKAMMA RANGE.			
Draw well	Malakondapenta	1913	264	Perennial. Wholesome.	By camping officers and subordinates stationed at Malakondapenta.
Do.	Iskagundam rest house	1928–29	169	Do.	By camping officers.
Tube well	Do.	1937–38	643	Do.	By subordinates at Iskagundam.
Jangam Bhavi	Uyyalavada Reserve Forest.	..	..	Semi-perennial, eight months.	Cattle.
Doni Bhavi	Do.	..	..	Do.	Cattle and travellers.
Ramana Bhavi or Narasamma Bhavi.	Do.	..	..	Semi-perennial, six months.	Cattle.
Old plantation well (draw well).	....	..	..	....	....
		GIDDALUR RANGE.			
Draw well	Giddalur Range office compound.	1912–13	970	Perennial. Slightly brackish.	By Range officers, Giddalur and Gundlakamma and range staff.
Do.	Sandrapodu rest house	1927–30	492	Perennial. Wholesome.	By camping officers.
Kothabhavi	Nallamalai Reserve Forest near Sim's line and north of district boundary between Cuddapah and Kurnool.	..	..	Perennial	....
Jangambhavi	Between Jangambhavi kuppa and Gunikonda.	..	..	Dries up for three months during summer.	....
Papiledu koneru	South of Papiledu konda	..	..	Wholesome, perennial.	....
Berllallka bhavi	North Veligonda Reserve Forest east of Cherlopalli.	..	..	..	....
Madhava well	South Veligonda near Ramalingeswaram temple in Madhava.	..	..	Good drinking water available throughout the season.	Pilgrims, cattle graziers and cattle.
Subhamma bhavi	South Veligondas. By the side of Tirugulla Madhava footpath.	..	..	Good water available throughout.	Cattle graziers, cattle and travellers.
Nathillavani bhavi	South Veligondas. Near Godikanama - Konapalli footpath.	..	..	Do.	Do.
Boyina Ramana bhavi	Pothipalli-Utla Ankalavana.	..	..	Do.	Do.
Siddagani bhavi	West Veligonda Reserve Forest in Cagolasela about a furlong from terai line.	..	..	Dirty water, remains only for two, three months during rainy season.	Cattle.
Salvani bhavi	West Veligonda Reserve Forest by the side of the path from Khazipuram to Kondukunta about ¼ mile.	..	..	Dirty water, dries up for three or four months in summer.	Do.
		GANJIVARIPALLE RANGE.			
Wells.					
Draw well	Ganjivaripalli rest house	1926–27	310	Wholesome, perennial.	Rest house.
Do.	Ganjivaripalli range quarters.	..	..	Do.	By Range Officer and his headquarters staff.
Do.	Telugurayani cheruvu	1909–10	560	Do.	Rest house, subordinates and gudem Chenchus.
Well	Guttalachenu old gudem site.	1919–20	380	Dirty, water dries up for two or three months in summer.	Not used by anybody.
Draw well	Chinnarutla	1917–18	750	Wholesome, perennial.	Rest house, Chenchus and by Srisailam pilgrims.
Step wells.					
Allipalem koneru	Allipalem gudem	..	..	Wholesome, perennial.	By gudem Chenchus and Srisailam pilgrims.
Yatham bhavi	Near Anjaniyaswami temple-Doddanala.	..	..	Do.	By pilgrims and Chenchus.
Do.	Near Telugurayanicheruvu.	..	..	Dirty water, perennial.	By cattle.
Morricheruvu bhavi	In Morricheruvu tank	..	..	Dirty water, almost throughout the year.	By cattle and penta graziers.
Mothota bhavi	Near Palutla	..	..	Dirty water, perennial.	By cattle.
Bhavipenta well	Near Bhavipenta	..	..	Wholesome. Water available almost throughout the year.	By cattle and graziers.
Tank.					
Telugurayanicheruvu	Markapur Reserve Forest 13 miles from Ganjivaripalli.	..	..	Bund and sluice are leaky, water remains in small pits and ponds almost throug the year.	By cattle and graziers.

Description. (1)	Locality. (2)	Year of construction. (3)	Cost. (4) RS.	Nature of water-supply. (5)	Use. (6)
	GANJIVARIPALLE RANGE—*cont.*				
Tanks—cont.					
Morricheruvu	On the way from Telugurayanicheruvu to Chinnarutla on the plateaux.	..	..	Water is not fit for human consumption.	By cattle.
Kuntas.					
Buthoti kunta	In the 11th mile on road from Ganjivaripalli-Telugurayanicheruvu.	..	200	Muddy water, five months during rains.	Do.
Doddanala kunta	Near Doddanala penta ..	..	200	Do.	Do.
Ankamma kunta	Near Guttalachenu ..	..	..	Muddy water, seven months during rains.	Do.
Springs.					
Chinnarutla	In Peddarutla stream ..	..	..	Dirty water, perennial.	By cattle and Chenchus.
Peddarutla stream ..	Near Peddarutla	..	..	Dirty water, perennial (as water remains in pools always).	Do.
Pullavula dona	Near Pullavula dona penta.	..	..	Dirty water, nine months during the year.	By cattle and graziers.
Madapu chelama	Near Madapu chelama gudem.	..	..	Wholesome, perennial.	By cattle and Chenchus.
Nekkanti spring	In Nekkanti stream near Nekkanti.	..	..	Wholesome during rains, afterwards gets dirty, perennial.	Do.
Bandaleru pools	Near Palutla and Guttalachenu.	..	..	Wholesome, excepting during summer four months, perennial.	By cattle, Chenchu and Sugalis of Guttalachenu and Palutla.
	TURIMELLA RANGE.				
Wells.					
Draw-well	Maddipenta	1908–09 ..	500	Very little water in summer; quality tolerable.	By subordinates at Maddipenta.
Do.	Papinenipalli rest-house ..	1908–09 ..	112	Perennial, wholesome.	By camping officers.
Do.	Turimella Range quarters.	1915–16 ..	336	Perennial, not wholesome.	By Ranger and his headquarters staff.
Step-well	In Cumbum Reserve Forest near Chelama on the way to Velagalapaya.	..	300	Dries up in summer ..	By cattle.
Step-well, Komativanibhavi.	Near 7th mile-stone on Papinenipalli-Pogapad road.	..	400	Dries up in summer, wholesome.	Do.
Bizamipalli kunta, step-well.	Bizamipalli kunta ..	..	500 500	Dries up in summer ..	Do.
Narava Bhavi	In E.N. Block 1	..	500	Do. ..	Do.
Kuntas.					
Peraiyakunta	Cumbum Reserve Forest.	..	1,000	....	Do.
Bizamipalli kunta ..	Do.	..	2,000	....	Do.
Vemulakunta	In E.N. Block 1	..	800	....	Do.
	MARKAPUR RANGE.				
Wells.					
Draw-well	In Range office compound.	..	450	Wholesome, perennial.	By Range Officer and his headquarters staff.
Do.	Near Regati kunta in E.N. Block III.	..	600	No water	Water dried up.
Do.	Near Katamraju in E.N. Block IV.	..	500	Wholesome, perennial.	By cattle and pilgrims.
Veerannakonda well ..	In E.N. Block II	..	200	Do.	Do.
Tanks.					
Musalamma tank	In E.N. Block IV near Kalanutla.	..	400	Dirty, does not retain water.	By cattle.
Kuntas.					
Bangaramma kunta ..	E.N. Block IV	..	400	Water dirty, available for five months.	Do.
Regati kunta	Do.	..	300	Water dirty, available for seven months.	Do.
Gummavari kunta ..	E. N. Block II near Donakonda.	..	300	Water dirty, available for six months.	Do.
Sarva kunta	E.N. Block II near Mogatur.	..	1,000	Water dirty, available for eight months.	Do.
Meruguchennaya kunta ..	E.N. Block IV near Katamraju temple.	..	200	Water dirty, available for four months.	....
Balireddi kunta	Cumbum Reserve Forest near Ganapalli.	..	100	Do.	....
Pedda kunta	E.N. Block IV near Pothuraju.	..	150	Do.	By cattle.
Marri kunta or Ayyarappa kunta.	E.N. Block IV	..	..	Do.	Do.
Lothu kunta	E.N. Block IV, Magatur beat.	..	300	Water dirty, available for five months.	Do.
Ragayya kunta	E.N. Block IV	..	150	Do.	Do.
Yellappa kunta	E.N. Block IV, Gottipadiya beat.	..	250	Do.	Do.
Buchireddi kunta ..	E.N. Block III in Nagulavaran.	..	100	Water dirty, available for four months.	Do.
Pullareddi kunta	....	..	..	Do.	Do.

SECTION 4.—YIELD.

253. The following statements show the yield obtained in the past :—

Year. (1)	Selection *cum* Improvement Working Circle. Gundlakamma series. Coupe number. (2)	Area worked in acres. (3)	Timber outturn. (4) C.FT.	Timber Working Circle. Vedurlakonda series. Coupe number. (5)	Area worked in acres. (6)	Outturn Timber. (7) C.FT.	Outturn Fuel. (8) C.FT.	Malakonda penta series. Coupe number. (9)	Area worked in acres. (10)	Outturn Timber. (11) C.FT.	Outturn Fuel. (12) C.FT.
1925–26 ..	..	..	..	I	130	6,412	2,760	I	16,666	147	8,000
1926–27 ..	..	..	..	II	102	9,805	10,840	II	117	5,263	1,580
1927–28 ..	..	..	..	III	108	6,952	2,580	III	160	Not worked.	
1928–29 ..	..	..	..	IV	116	2,954	9,020		Not worked.		
1929–30 ..	..	..	..	IV	12	2,229	3,440	III	49	4,142	..
				V	88	3,697	5,760	IV	136	9,119	4,720
1930–31 ..	I	110	4,598	VI	18	1,585	800	III	111	16,572	..
								V	68	8,896	..
1931–32 ..	II	100	3,080	VI	76	16,096	20,800	VI	130	16,618	37,580
								VII	114	12,983	6,740
1932–33 ..	III	120	2,838	VII	40	2,637	..	VII	56	5,669	12,800
				VII	80	11,948	..	VIII	100	6,648	14,800
1933 34 ..	IV	89	3,203	VIII	68	8,839	..	VIII	40	3,151	..
								IX	78	10,493	..
1934–35 ..	V	127	2,733	IX	62	9,941	16,400	X	95	12,618	4,000
1935–36 ..	VI	110	4,016	X	51	5,577	7,200	XI	58	9,333	22,740
				XI	32	1,421	15,280		..		
1936–37 ..	VII	125	7,232	XII	62	5,791	10,400	XII	89	9,104	25,680
1937–38 ..	VIII	77	4,172	XI	29	2,349	1,400	XIII	89	6,666	10,280
1938–39 ..	IX	85	4,873	XIII	69	4,924	11,900		Not worked.		

Clearfelling Working Circle.

Year.	Iskagundam series. Coupe number.	Area worked in acres.	Outturn Timber	Outturn Fuel.	Sandrapodu series. Coupe number.	Area worked in acres.	Outturn Timber.	Outturn Fuel.	Mamidigundam series. Coupe number.	Area worked in acres.	Outturn Timber.	Outturn Fuel.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
			C.FT.	C.FT.			C.FT.	C.FT.			C.FT.	C.FT.
1925-26 ..	..	..	..	..	..	..	..	..	..	..	..	..
1926-27 ..	..	..	..	..	..	..	..	..	..	..	..	..
1927-28 ..	..	..	..	..	..	..	..	..	..	—	..	..
1928-29 ..	..	..	..	..	..	..	..	..	..	..	..	..
1929-30 ..	I	47	5,019	20	I	51	18,918	..	I	43	7.277	850
1930-31 ..	II	50	7,200	..	II	54	8,949	..		No demand.		
1931-32 ..	III	56	7,550	..	III	56	4,053	90	II	83	4,451	..
1932-33 ..	IV	39	9,571	..	IV	46	3,890	..	III	52	4,375	20
1933-34 ..	V	46	5,556	..	V	70	11,117	2,360	IV	34	5,049	1,240
1934-35 ..	VI	57	12,961	..	VI	52	9,471	1,370	V	45	7,995	2,090
1935-36 ..	VII	47	7,184	..	VII	54	9.975	290	VI	56	6,402	1,570
1936-37 ..	VIII	57	10,638	..	VIII	56	7,678	2,280	VII	71	4,796	1,720
1937-38 ..	IX	35	5,186	..	IX	47	3,992	..		No demand.		
1938-39 ..												

Clearfelling Working Circle.

Year.	Bodi series. Coupe number.	Area worked in acres.	Outturn Timber.	Outturn Fuel.	Mogilutla series Coupe number.	Area worked in acres.	Outturn timber.	Thummalabailu series. Coupe number.	Area worked in acres.	Outturn timber.	Maddipenta series. Coupe number.	Area worked in acres.	Outturn timber.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
			C.FT.	C.FT.			C.FT.			C.FT.			C.FT.
1925-26	..	..	..	..	..	..	..	..	..	..	..	..	..
1926-27	..	..	..	..	..	..	..	..	..	..	..	..	..
1927-28	..	..	..	..	I	37·6	1,362	I	18	684	I	22	587
1928-29	..	..	..	..	II	40	559	II	24	936	II	20	485
					III	40	806	III	20	921	III	35	Not worked.
1929-30	..	..	..	..	IV	21	844	IV	20	928	IV	33	
1930-31	..	No demand.			V	52	Not worked.	V	20	Not worked.	IV	17	164
		Do.			V	52	1,042	Series closed down.			V	15	185
1931-32	..				VI	No felling.					VI	No felling.	
	I	43	3,502	11,800							I	22	288
1932-33	II	No demand.			I	37·6	2,111	..	..	..	II	20	2,336
1933-34	II	60	4,164	7,800	II	43	5,555	..	..	..			
1934-35					VI	52	6,558						
					III	40	5,979	..	..	..	III	35	8,010
1935-36	..	No demand.			VII	53	10,052						
					IV	21	4,009	..	..	..	IV	17	1,271
1936-37	..	..	..	..	VIII	44	6,043						
					V	52	7,221	..	..	..	V	3	..
1937-38	..	..	..	..	IX	75	14,852						
					X	88	11,714	..	..	..		Not worked.	
1938-39	..	..	..	..									

Timber Selection Working Circle.

Year.	Telugurayanicheruvu Series. Coupe number.	Outturn.	Guttalacheru Series. Coupe number.	Outturn.	Regumanipenta Series. Coupe number.	Outturn.	Papinenipalle Series. Coupe number.	Outturn
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		C.FT.		C. FT.		C.FT.		C.FT.
1925-26	..	..	..	..	..	..	..	..
1926-27	..	..	..	..	..	..	..	..
1927-28	I	62	I	105	I	150	I	363
1928-29	II	126	II	50	II	225	II	1,038
1929-30	III	70	III	79	III	320	..	..
1930-31	IV	168	IV	144	IV	13	..	..
1931-32	V	..	V	99	V	..	..	..
1932-33	VI	157	VI	91	VI	55	III part.	88
1933-34	VII	953	VII	95	VII	191	III part.	132
1934-35							IV	600
	VIII	171	VIII	111	VIII	465	V	1,096
1935-36	IX	99	IX	113	IX	104	VI	427
1936-37	X	139	X	143	X	82	VII	160
1937-38	I	186	I	206	I	19	VIII	458
1938-39								

Softwood Working Circle. / **Bamboo Timber Working Circle.**

Year.	Dornal Range Softwood Series. Coupe number.	Area in acres.	Outturn.	Turimella Range Softwood Series. Coupe number.	Area in acres.	Outturn.	Tunnel Series. Coupe number.	Area worked in acres.	Outturn.	Halakondapenta Series. Coupe number.	Area worked in acres.	Outturn.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
			C. FT.			C FT.			CF·T.			C.FT.
1925-26	..	..	..	..	..	..	I	72	475	I	105	908
1926-27	..	..	..	..	..	..	II	68	289		Not worked.	
1927-28	I	740	4,700	I part.	3,940	3,800	III	86	488	II	70	1,065
1928-29												
1929-30	II	Not worked.			Not worked.		IV	88	234	III	75	1,160
										IV	70	2,851
1930-31	II	1,820	600	I part.	..	1,356	V	74	888	V	84	3,085
	III	1,750	Not worked.	II	3,750	6,284	..	..	..	..	..	..
1931-32	III part.	..	963		Not worked.		VI	86	1,054	VI	70	1,172
	IV	1,714	929	..	..	..						
1932-33	IV part.	..	1,247	V	13,056	1,422	VII	96	220	VII	80	2,421
	V	724	1,694	..	..	..	..	..	..	..	..	..
1933-34	VI	410	1,540	VI	9,728	995	VIII	102	445	VIII	89	3,065
1934-35	VII	798	1,537	VII	9,216	1,122	IX	88	589	IX	70	2,255
1935-36	VIII	999	1,762	VIII	7,296	2,784	X	80	576	X	70	996
1936-37		No demand.		IX	1,376	5,389	XI	85	72	XI	80	228
1937-38		Do.		X	6,464	2,649	XII	83	358	XII	82	213
1938-39	IX	1,639	988	I	No demand.		XIII	..	150	XIII	..	167

Miscellaneous Timber Working Circle.

Year.	Chilakacherla Series. Coupe number.	Chilakacherla Series. Area in acres.	Chilakacherla Series. Outturn.	Chinnamantrala Series. Coupe number.	Chinnamantrala Series. Outturn.	Peddachama Series. Coupe number.	Peddachama Series. Outturn.	Peddamantrala Series. Coupe number.	Peddamantrala Series. Outturn.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					C.FT.		C.FT.		C.FT.
1925-26	..	..	..	..	..	..	..	..	..
1926-27	..	..	..	..	..	..	..	..	..
1927-28	..	..	..	..	..	..	..	..	..
1928-29	I	..	..	I	712	I	229	I	90
1929-30	II	..	..	II	1,154	II	Not worked.	II	168
1930-31	III	..	..	III	1,387	..	..	..	..
1931-32	I	..	..	II	..	..	..	..	..
1932-33	II	..	..	II	..	..	..	..	..
1933-34	III	..	..	I	..	..	..	..	..
1934-35	I	..	..	II	..	..	..	..	..
1935-36	II	..	..	III	..	..	..	..	..
1936-37	III	..	..	I	..	..	..	..	..
1937-38	I	400	..	II	..	..	..	..	..
1938-39	..	..	..	..	..	..	..	..	..

Miscellaneous Timber Working Circle.

Year.	Dornal range B & C type of forest. Yield.	Turimella Range—Maddipenta. Coupe number.	Turimella Range—Maddipenta. Yield.	Chinnarutla Yegi Series. Coupe number.	Chinnarutla Yegi Series. Yield.
(1)	(2)	(3)	(4)	(5)	(6)
	C.FT.		C.FT.		C.FT.
1926-27	..	..	..	..	..
1927-28	..	I	..	..	..
1928-29	645	I	1,596	..	..
1929-30	1,677	II	1,871	..	..
1930-31	1,183	III	483	..	..
1931-32	859	I	386	III	110
1932-33	515	No demand.	..	I	129
1933-34	571	Do.	..	II	121
1934-35	1,435	Do.	..	III	121
1935-36	601	..	..	I	137
1936-37	950	..	..	II	77
1937-38	550	..	..	III	88
1938-39	..	..	..		44

Small Timber Working Circle.

Year.	Chintala. Coupe number.	Chintala. Area worked in acres.	Chintala. Yield.	Peddachama. Coupe number.	Peddachama. Area worked in acres.	Peddachama. Yield.	Tadutla. Coupe number	Tadutla. Area worked in acres.	Tadutla. Yield. Timber.	Tadutla. Yield. Fuel.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
			C.FT.			C.FT.			C.FT.	C.FT.
1926-27	..	..	..	..	..	..	..	..	..	..
1927-28	..	..	..	..	..	..	..	..	..	..
1928-29	..	..	..	..	..	..	..	..	..	..
1929-30	..	..	..	..	..	..	..	..	..	..
1930-31	I		727	I		370	..	..	..	..
1931-32	II		..	II		..	..	..	..	..
1932-33	II		724	II		447	..	..	..	..
1933-34	III		634	II		539	I	124	580	7,000
1934-35	IV	1,829	1,561	III	478	1,021	II	94	450	5,200
1935-36	V		1,174	IV		1,246	III	120	..	13,000
1936-37	VI		879	V		3,148	IV	107	226	4,770
1937-38	VII		548	VI		1,065	V	93	350	10,000
1938-39	VIII		259	VII		632	VI	..	323	54,040

Small Timber Working Circle.

Year.	Chintapalli. Coupe number.	Chintapalli. Area worked in acres.	Chintapalli. Yield. Timber.	Chintapalli. Yield. Fuel.	Yerraguntla. Coupe number.	Yerraguntla. Area worked in acres.	Yerraguntla. Yield. Timber.	Yerraguntla. Yield. Fuel.	Veerareddikunta. Coupe number.	Veerareddikunta. Area worked in acres.	Veerareddikunta. Yield. Timber.	Veerareddikunta. Yield. Fuel.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
			C.FT.	C.FT.			C.FT.	C.FT.			C.FT.	C.FT.
1926-27	..	..	..	..	..	..	..	..	..	..	..	..
1927-28	..	..	..	..	..	..	..	..	..	..	..	..
1928-29	..	..	..	..	..	..	..	..	..	..	..	..
1929-30	..	..	..	..	..	..	..	..	..	..	..	..
1930-31	I	109	2,509	12,100	..	..	..	..	I	104	277	12,400
1931-32		No demand.								No demand.		
1932-33	II	131	2,178	25,400	I	141	4,607	2,000	II	128	261	26,840
1933-34	III	107	5,237	29,000	II	108	5,840	3,500	III	116	1,020	23,040
1934-35	IV	133	2,765	23,000	III	117	6,238	10,600	IV	117	708	21,700
1935-36	V	136	7,077	29,560	IV	128	6,743	18,000	V	130	37	25,060
1936-37	VI	130	4,523	17,000	V	114	5,044	4,600	VI	141	2,175	21,000
1937-38	VII	121	7,487	15,000	VI	141	8,860	1,880	No demand.			
1938-39	VIII	142	4,717	75,950	VII	132	8,356	23,360	..	..	..	..

Small Timber Working Circle.

Year.	Mallalama. Coupe number.	Mallalama. Area worked.	Mallalama. Yield. Timber.	Mallalama. Yield. Fuel.	Barlakunta. Coupe number.	Barlakunta. Area worked.	Barlakunta. Yield. Timber.	Barlakunta. Yield. Fuel.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		ACS.	C.FT.	C.FT.		ACS.	C.FT.	C.FT.
1926-27	..	..	..	..	..	..	..	..
1927-28	..	..	..	..	..	..	..	..
1928-29	..	..	..	..	..	..	..	..
1929-30	..	..	..	..	..	..	..	..
1930-31	..	..	..	..	..	..	..	..
1931-32	..	..	..	..	..	..	..	..
1932-33	..	..	..	..	..	..	..	..
1933-34	I	165	789	15,090	..	..	..	..
1934-35	II	209	Nil.	13,000	..	..	..	..
1935-36	III	232	Nil.	23,530	..	..	..	..
1936-37	IV	221	1,125	25,680	..	..	..	..
1937-38	V	156	Nil.	62,784	I	73	209	8,770
1938-39	..	..	Nil.	..	..	No demand.	..	..

Fuel (Simple Coppice).

Year.	Markapur Range. Magatur. Coupe number.	Area worked.	Yield.	Markapur Range. Regatikunta. Coupe number.	Area worked.	Yield.	Giddalur Range. Diguvametta. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		ACS.	C.FT.		ACS.	C.FT.		ACS.	C.FT.	C.FT.
1928–29	I	34	12,241	I	16	8,176	..	..	..	..
1929–30	II	24	3,271	II	20	5,640	I	65	..	4,000
1930–31	III	26	2,400	III	19	4,520	II	43	297	9,000
1931–32		Not worked.			No demand.		III	116	140	11,450
1932–33		Do.		IV	13	8,540	IV	35	..	650
1933–34	IV	4	12,240		No demand.			No demand.		
1934–35		No demand.			Do.		..	..	..	..
1935–36		Do.			Do.		..	..	..	..
1936–37		Do.			Do.		..	..	..	..
1937–38		Do.			Do.		V	80	..	23,520
1938–39	..	..	..	..	..	..				

Year.	Giddalur Range—*cont.* Kothakota. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.	Turimella Range. Boggulasorana. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.	Turimella Range. Somidevipalli. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
		ACS.	C.FT.	C.FT.		ACS.	C.FT.	C.FT.		ACS.	C.FT.	C.FT.
1928–29	..	..	..	..	I	10	200	1,728	XI	42	..	7,416
1929–30	..	..	..	..	II	12	..	1,150	XII	54	..	1,920
1930–31	..	..	..	..	III	20	..	20	XIII part.	58	..	1,600
1931–32	..	..	..	..	..		No demand.			No demand.		
1932–33	I	90	Nil.	7,000	..	..	..	..	..	..	..	..
1933–34	II	56	..	5,600	..	..	..	..	XIII part.	8	..	1,152
1934–35	III	96	..	8,800	..	..	..	..		No demand.		
1935–36	IV	76	60	8,520	..	..	..	..		Do.		
1936–37		No demand.			..	..	..	..		Do.		
1937–38	..	..	..	..	..	..	..	..	..	..	..	..
1938–39	..	..	..	..	..	..	..	..	..	..	..	..

Year.	Turimella Range—*cont.* Tallapaya. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.	Turimella Range—*cont.* Tummalapenta. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.	Turimella Range—*cont.* Utla. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.
	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)
		ACS.	C.FT.	C. T.		ACS.	C.FT.	C.FT.		ACS.	C.FT.	C.FT.
1928–29	I	11	..	3,816	V	43	..	20,624		Not worked.		
1929–30	II	14	..	900	VI	51	..	20,145	I	26	..	7,120
	II addition.	24	..	60	Indicator area.	3	..	1,402	II	31	..	5,221
1930–31	II	..	..	321	VII	56	..	3,000	III	36	..	3,000
	III	30	Not worked.									
1931–32		No demand.			VIII	80	..	3,980	IV	38	..	18,000
1932–33	IV	9·6	..	2,160		No demand.			V	30	..	3,637
1933–34		No demand.				Do.				No demand.		
1934–35		Do.			X	35	..	51,830	VII	35	..	22,996
1935–36		Do.				No demand.			VI	27	..	30,965
1936–37		Do.			IX	62	..	96,081		No demand.		
1937–38	..	..	..	..	XI	70	..	3,040	VIII	30	..	14,045
1938–39	..	..	..	..	XII	46	2,075	12,000	..	..	..	..

Year.	Turimella Range—*cont.* Vemulakunta. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.	Turimella Range—*cont.* Bairanjmulla. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.	Turimella Range—*cont.* Lingamayyakuruva. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.
	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)
		ACS.	C.FT.	C.FT.		ACS.	C.FT.	C.FT.		ACS.	C.FT.	C.FT.
1928–29		Not worked.			..	..	..	..	..	..	..	..
1929–30	I	92	.	10,300	..	..	..	..	..	..	..	..
1930–31	II	96	.	9,640	I	Not worked by contractor.			I	32	..	1,800
1931–32		No demand,				No demand.				No demand.		
1932–33	III	73	.	5,220		Do.				Do.		
1933–34		No demand.				Do.				Do.		
1934–35	V	80	.	55,510		Do.				Do.		
1935–36		No demand.				Do.				Do.		
1936–37	IV	90	..	39,600		Do.				Do.		
1937–38	VI	72	.	14,946		Do.				Do.		
1938–39		No demand.				Do.				Do.		

Year.	Turimella Range—*cont.* Uppukontipaya. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.	Turimella Range—*cont.* Bollupalli. Coupe number.	Area worked.	Yield. Timber.	Yield. Fuel.
	(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)
1928–29	..	..	..	..	..	..	..	..
1929–30	..	..	..	..	..	..	..	..
1930–31	I	Not worked by contractor.			I	Not worked by contractor.		
1931–32		No demand.				No demand.		
1932–33		Do.				Do.		
1933–34		Do.				Do.		
1934–35		Do.				Do.		
1935–36		Do.				Do.		
1936–37		Do.				Do.		
1937–38		Do.				Do.		
1938–39		Do.				Do.		

Turimella Range—*cont.*

Year.	Melamanikunta. Coupe number. (56)	Area worked. (57)	Yield. Timber. (58)	Yield. Fuel. (59)	Gurralakonda. Coupe number. (60)	Area worked. (61)	Yield. Timber. (62)	Yield. Fuel. (63)
		ACS.		C.FT.		ACS.		C.FT.
1928–29	..	..	..	..	..	..	..	..
1929–30	..	..	..	..	..	..	..	..
1930–31	I	40	..	200	I	31	..	4,645
1931–32		No demand.			II	30	..	780
1932–33		Do.			III	25	..	3.740
1933–34		Do.				No demand.		
1934–35		Do.				Do.		
1935–36		Do.			..	..	..	..
1936–37		Do.			IV	45	..	16,560
1937–38		Do.			..	..	..	..
1938–39		Do.			..	..	..	..

Coppice with Standards—Small timber.

Range. (1)	Name of felling series. (2)	Year. (3)	Coupe number. (4)	Area worked. (5)	Yield. Timber. (6)	Yield. Fuel. (7)
				ACS.	C.FT.	C.FT.
Giddalur ..	Uyyalavada felling series ..	1930–31 ..		No demand.		
		1931–32 ..		Do.		
		1932–33 ..	I	112	102	6,410
		1933–34 ..	II	95	447	5,600
		1934–35 ..	III	46	38	6,290
		1935–36 ..		No demand.		
		1936–37 ..	IV	64	253	6,000
		1937–38 ..		No demand.		
		1938–39 ..		Do.		

Consolidated yield statement.

Year. (1)	Big timber. (2)	Poles. (3)	Small timber. (4)	Softwood timber. (5)	Fuel. (6)
	C.FT.	C.FT.	C.FT.	C.FT.	C.FT.
1928–29	1,553	7,567	4,161	8,500	63,021
1929–30	4,245	22,686	6,309	..	71,049
1930–31	8,571	58,431	7,405	8,240	61,316
1931–32	5,416	63,073	1,867	1,622	96,880
1932–33	5,608	34,510	9,073	4,363	87,647
1933–34	6,834	54,666	16,048	2,535	102,892
1934–35	5,698	62,894	16,187	2,659	250,726
1935–36	5,725	70,799	18,781	4,546	197,315
1936–37	7,609	49,779	19,275	5,389	278,181
1937–38	4,831	54,200	19,784	2,649	137,375
1938–39	4,917	25,816	17,231	988	307,870
Total for nine years, 1930–39	**55,209**	**474,168**	**125,651**	**32,991**	**1,520,202**
Average for last nine years	6,134	52,685	13,961	3,666	168,911

The old Kurnool East Working Plan came into force in 1928–29 and Chelama Plan which includes two series in Gundlakamma came into force from 1926. The yield figures for 1928–29 and 1929–30 relate only to working circles under these two plans. The Giddalur-Gundlakamma Plan came into force in 1930 and the yield from that year onwards represents the total yield from the division as at present constituted. The average for the last nine years is given at the end of the statement.

Bamboos.

Year. (1)	I class bamboos. (2)	II class bamboos. (3)	III class bamboos. (4)	Erikala splits bundles. (5)	Medare splits bundles. (6)	Goading sticks. (7)	Walking sticks. (8)	Cot logs. (9)	Scaffolding bamboos. (10)	Kavadi splits (11)	Banah karralu. (12)	Mullu karralu. (13)	Dry and dead bamboos. (14)
1928–29	21,348	19,733	28,613	9,423	3,774	25,132	1,193	166	4,067	5,226	..	..	1,600
1929–30	58,379	15,747	13,428	6,853	7,452	51,865	2,944	141	1,925	6,277	..	..	..
1930–31	66,585	53,371	31,356	16,842	6,381	40,550	27,700	498	2,201	778	..	..	..
1931–32	84,729	45,008	20,388	12,684	8,214	46,040	13,050	303	1,013	628	..	..	200
1932–33	1,52,683	93,308	27,484	14,660	7,748	80,089	13,651	540	2,775	3,282	..	..	..
1933–34	1,22,900	48,975	48,121	25,450	7,451	56,258	14,560	..	2,788	1,217	..	1,410	..
1934–35	36,470	50,063	62,878	15,432	8,469	1,00,146	21,234	..	8,195	2,101	..	1,152	1,615
1935–36	50,396	83,179	58,671	12,895	12,094	2,01,475	23,316	11,749	1,360	3,310	500	2,500	..
1936–37	64,474	1,23,745	94,806	20,136	12,203	2,50,994	17,524	872	7,747	882	..	..	4,91,900
1937–38	43,991	57,580	66,697	15,289	12,996	2,85,826	64,056	5,458	16,868	3,061	8,22,950	31,210	4,600
1938–39	75,295	59,433	23,990	13,602	11,996	91,045	16,536	3,836	..	5	..	42,349	1,400

Minor Forest Produce.

Year.	Tamarind shelled. (1) T.	CWT.	QR.	LB.	Tamarind green. (2) T.	CWT.	QR.	LB.	Soapnuts. (3) T.	CWT.	QR.	LB.	Kanuga kernels. (4) T.	CWT.	QR.	LB.	Myrobalans. (5) T.	CWT.	QR.	LB.
1928–29	92	12	1	7	1	5	0	0	51	2	2	5	3	0	3	21		..		
1929–30	10	10	0	26		..			2	10	0	0		..			0	1	1	8
1930–31	9	9	1	4		..			35	12	0	18		..			1	12	0	16
1931–32	4	2	2	8		..			29	11	3	8		..				..		
1932–33	53	18	0	20		..			12	0	2	4		..				..		
1933–34	21	12	0	4		..			23	0	1	6		..			1	18	2	8
1934–35	13	19	0	0	3	5	0	0	19	1	2	6		..			0	0	6	7
1935–36		..				..			11	6	3	16		..			0	0	7	14
1936–37	20	19	3	20		..			1	16	1	1		..			1	3	0	6
1937–38	49	1	2	7	4	3	0	0	91	5	1	7		..			34	14	3	23
1938–39	18	5	2	24		..			8	7	1	13		..			6	13	0	24
Total ..	**249**	**10**	**3**	**8**	**8**	**13**	**0**	**0**	**285**	**14**	**3**	**0**	**3**	**0**	**3**	**21**	**46**	**6**	**2**	**22**

Year.	Sarapappu. (6) T. CWT. QR. LB.	Nux-vomica. (7) T. CWT. QR. LB.	Honey. (8) T. CWT. QR. LB.	Wax. (9) T. CWT. QR. LB.	Horns, sambhur. (10) T. CWT. QR. LB.
1928–29	..	1 16 1 24	0 0 3 6	..	0 10 2 14
1929–30	..	0 0 3 2	0 15 0 0	0 2 1 10	1 0 3 0
1930–31	0 3 0 4	6 11 2 18	1 10 0 0	0 8 2 2	1 2 0 9
1931–32	..	1 5 2 18	0 1 0 8	..	0 0 3 0
1932–33	..	..	0 8 2 8	0 0 1 12	0 3 2 8
1933–34	..	..	0 5 1 22	0 4 1 26	0 0 2 24
1934–35	..	0 18 3 0	0 0 2 19	0 2 2 14	0 6 0 0
1935–36	0 0 3 16	2 4 3 20	2 1 2 26	0 8 3 20	0 7 0 20
1936–37	0 0 0 8	..	1 3 2 12	0 0 0 8	0 14 1 4
1937–38	..	6 5 1 0	2 11 2 15	3 3 1 21	6 15 1 14
1938–39	1 6 0 12	..	0 3 1 26	0 7 3 12	0 12 2 0
Total ..	**1 10 0 12**	**19 3 1 26**	**9 2 0 2**	**1 18 2 13**	**11 13 3 9**

Year.	Horns, deer. (11) T. CWT. QR. LB.	Wood apples, Nos. (12) T. CWT. QR. LB.	Thangedu bark. (13) T. CWT. QR. LB.	Tumki leaves. (14) T. CWT. QR. LB.
1928–29	..	21,100	132 8 1 26	..
1929–30	..	38,800	199 7 1 13	..
1930–31	..	21,900	139 9 1 8	0 6 3 15
1931–32	..	..	26 2 0 16	..
1932–33	..	..	..	..
1933–34	..	30,500	28 0 3 16	..
1934–35	0 0 0 21	2 13 2 8	..	..
1935–36	0 5 3 0	77,600	..	..
1936–37	0 4 2 0	25,100	36 2 3 26	18 13 2 8
1937–38	..	2 15 3 0	38 0 0 0	135 18 2 11
1938–39	0 10 2 24	45,310 25 0 0 0	10 1 3 4	..
Total ..	**1 1 0 17**	**30 16 1 24** **Nos. 2, 60, 310**	**609 12 3 25**	**154 19 0 6**

Year.	Madapa leaves. (15) T. CWT. QR. LB.	Karivepaku. (16) T. CWT. QR. LB.	Palmyra leaves. (17) T. CWT. QR. LB.	Usirikaye. (18) T. CWT. QR. LB.	Palmyra fruits. (19) T. CWT. QR. LB.
1928–29	49 2 2 0	..	..	..	..
1929–30	74 1 1 16	..	..	..	..
1930–31	110 5 1 0	5 0 0 0	7 10 0 0	17 2 3 12	..
1931–32	..	..	..	..	..
1932–33	61 17 3 12	..	0 11 1 20	2 2 2 18	1 0 0 0
1933–34	35 7 0 16	..	3 10 0 0	5 14 1 4	0 5 0 0
1934–35	..	..	..	3 0 0 0	..
1935–36	5 19 1 4	..	..	33 15 2 24	0 10 2 24
1936–37	16 10 0 0	..	..	16 7 0 16	..
1937–38	379 12 0 16	..	28 15 3 6	70 12 0 12	8 0 0 0
1938–39	6 12 0 10	..	1 11 0 6	3 4 2 27	0 6 2 0
Total ..	**679 7 2 18**	**5 0 0 0**	**41 17 5 4**	**151 19 2 1**	**10 2 0 24**

SECTION 5.—REVENUE AND EXPENDITURE.

254. Statement showing past revenue, rangewar (figures given in number of rupees)—

Year.	Removed by Government agency. Timber.	Fire-wood and char-coal.	Sandal-wood.	Bamboos.	Other produce.	Removed by purchasers or consumers. Timber.	Fire-wood and char-coal.	Bamboos.	Grazing.	Minor forest produce.	Miscellaneous (includes revenue from fines, forfeitures, confiscated produce and other sources).	*Deduct* refunds.	Total revenue.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
						DORNAL RANGE.							
1928–29 ..	4,371	..	..	609	147	1,205	..	2,455	3,062	1,381	3,715	177	16,768
1929–30 ..	5,307	..	..	3	..	205	..	1,983	3,370	29	780	10	11,667
1930–31 ..	738	..	..	..	..	806	18	2,500	3,431	2,199	876	..	10,568
1931–32 ..	867	..	..	..	..	154	15	1,175	3,430	225	1,008	52	6,822
1932–33 ..	4,451	..	..	107	..	2	15	1,218	3,698	1,732	712	157	11,778
1933–34 ..	1,061	..	..	..	..	1,240	6	5,119	4,173	633	960	..	13,192
1934–35 ..	1,161	..	..	..	..	409	29	2,107	4,499	700	1,437	86	10,256
1935–36 ..	1,326	..	..	..	..	2,346	38	6,190	5,630	1,053	1,490	..	18,073
1936–37 ..	1,103	..	..	..	..	796	29	5,585	5,366	1,456	2,116	..	16,451
1937–38 ..	2,477	3	..	..	..	1,728	26	2,229	4,921	2,197	1,345	13	14,913

Year.	Removed by Government agency. Timber.	Fire-wood and char-coal.	Sandal-wood.	Bamboo.	Other produce.	Removed by purchasers or consumers. Timber.	Fire-wood and char-coal.	Bamboo.	Grazing.	Minor forest produce.	Miscel-laneous.	*Deduct* refunds.	Total revenue.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
						GUNDLAKAMMA RANGE.							
1928–29 ..	8,123	..	..	..	..	2,885	..	667	3,101	120	1,081	..	15,971
1929–30 ..	13,220	..	..	..	..	2,613	172	1,880	3,546	137	2,260	77	23,751
1930–31 ..	6,660	1	..	2	..	1,345	1,045	1,865	2,294	107	2,354	..	15,673
1931–32 ..	6,562	..	..	..	..	2,231	44	711	2,726	83	1,665	..	14,002
1932–33 ..	810	..	..	..	..	7,171	525	2,575	1,489	257	1,188	242	13,773
1933–34 ..	1,700	..	..	..	..	4,714	443	1,415	2,674	150	2,359	..	13,455
1934–35 ..	2,838	..	..	..	..	3,479	475	720	1,580	160	1,532	..	10,793
1935–36 ..	406	..	..	..	..	4,271	217	3,790	2,499	169	2,020	..	13,372
1936–37 ..	658	..	..	..	..	4,836	241	1,980	3,287	253	1,815	1	13,069
1937–38 ..	499	3	..	..	..	4,012	444	1,185	1,806	108	2,130	42	10,145

Year.	Removed by Government agency. Timber.	Fire-wood and char-coal.	Sandal-wood.	Bamboo.	Other produce.	Removed by consumers or purchasers. Timber.	Fire-wood and char-coal.	Bamboo.	Grazing.	Minor forest produce.	Miscel-laneous.	*Deduct* refunds.	Total revenue.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
						GIDDALUR RANGE.							
1928-29 ..	137	..	..	..	..	2,894	2,410	3,079	8,512	1,595	4,061	..	22,688
1929-30 ..	455	..	..	..	..	674	4,211	840	11,079	1,765	6,221	137	25,108
1930-31 ..	91	9	..	..	..	2,802	1,071	1,840	7,677	2,338	3,534	..	19,362
1931-32 ..	547	5	..	..	..	851	218	1,385	7,333	1,387	3,043	10	14,759
1932-33 ..	190	2	..	..	..	2,617	1,077	3,950	6,629	780	2,665	266	17,644
1933-34 ..	..	..	..	..	..	2,910	1,259	1,665	7,485	1,847	2,674	2	17,838
1934-35 ..	..	2	..	..	..	3,473	988	1,835	7,590	3,758	2,298	..	19,944
1935-36 ..	..	..	..	..	..	2,483	670	2,215	8,747	3,406	2,975	..	20,496
1936-37 ..	..	..	..	..	..	2,924	1,328	1,730	9,557	1,883	3,559	..	20,981
1937-38 ..	..	..	..	..		2,600	1,395	1,666	8,859	1,400	3,531	..	19,452

Year.	Removed by Government agency. Timber.	Fire-wood and char-coal.	Sandal wood.	Bamboo.	Other produce.	Removed by consumers or purchasers. Timber.	Fire-wood and char-coal.	Bamboo.	Grazing.	Minor forest produce.	Miscel-laneous.	*Deduct* refunds.	Total revenue.
1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
						GANJIVARIPALLI RANGE.							
1928-29 ..	..	..	..	85	..	10	..	..	6,137	21	242	50	6,445
1929-30 ..	741	..	..	184	..	..	..	..	5,811	..	268	10	6,994
1930-31 ..	207	..	..	115	..	6	1	..	5,280	150	465	..	6,224
1931-32 ..	216	..	..	224	..	9	9	..	6,865	415	848	..	8,586
1932-33 ..	457	..	..	209	..	..	1	..	7,033	872	441	150	8,863
1933-34 ..	755	..	..	295	..	9	9	31	7,301	341	1,318	..	10,059
1934-35 ..	1,050	..	..	647	..	36	5	..	9,106	555	1,111	..	12,510
1935-36 ..	770	..	..	309	..	12	3	..	10,702	52	1,268	..	13,116
1936-37 ..	428	..	—	343	..	15	10	..	9,576	515	1,154	..	12,041
1937-38 ..	906	4	..	179	..	4	12	..	8,140	1,251	1,162	..	11,658

Year.	Removed by Government agency. Timber.	Fire-wood and char-coal.	Sandal-wood.	Bamboo.	Other produce.	Removed by purchasers or consumers. Timber.	Fire-wood and char-coal.	Bamboo.	Grazing.	Minor forest produce.	Miscel-laneous.	*Deduct* refunds.	Total revenue.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
						TURIMELLA RANGE.							
1928-29 ..	1,998	133	..	35	284	305	726	800	8,115	3,051	1,831	50	17,228
1929-30 ..	798	..	..	..	1	1,848	2,005	2,350	8,475	1,852	1,850	31	19,148
1930-31 ..	255	..	..	29	..	326	2,165	800	7,318	1,732	1,457	..	14,082
1931-32 ..	96	..	..	..	..	294	1,067	445	7,275	1,797	1,497	153	12,318
1932-33 ..	676	..	..	1,252	..	239	726	107	6,336	1,853	1,858	966	12,081
1933-34 ..	28	31	..	..	..	557	121	1,439	7,385	585	3,776	..	13,922
1934-35 ..	727	14	..	..	..	1,272	634	420	7,439	1,024	4,051	13	15,568
1935-36 ..	..	..	..	..	..	384	211	683	7,830	233	3,933	..	13,274
1936-37 ..	..	..	..	..	..	753	618	879	8,470	1,243	4,306	..	16,269
1937-38 ..	340	8	..	..	..	456	788	750	8,725	1,312	3,517	4	15,892

Year.	Removed by Government agency. Timber.	Fire-wood and char-coal.	Sandal-wood.	Bamboo.	Other produce.	Removed by purchasers or consumers. Timber.	Fire-wood and char-coal.	Bamboo.	Grazing.	Minor forest produce.	Miscel-laneous.	*Deduct* refunds.	Total revenue.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
						MARKAPUR RANGE.							
1928-29 ..	297	60	..	..	..	67	289	50	4,366	3,802	846	50	9,727
1929-30 ..	..	..	..	..	..	1,039	253	30	5,035	2,543	978	19	9,859
1930-31 ..	..	..	..	..	..	346	248	..	6,173	2,823	1,575	..	11,265
1931-32 ..	..	..	..	..	..	62	54	..	5,982	1,178	2,016	20	9,272
1932-33 ..	165	90	..	..	..	24	15	..	5,509	1,170	709	51	7,631
1933-34 ..	..	2	..	..	..	133	160	31	6,235	501	942	329	7,675
1934-35 ..	..	..	..	..	..	395	53	..	6,319	582	2,213	113	9,449
1935-36 ..	..	..	..	..	..	137	38	..	5,688	193	1,601	1	7,656
1936-37 ..	..	..	..	31	55	22	..	..	5,400	812	1,495	..	7,815
1937-38 ..	..	5	..	..	..	589	83	200	6,890	1,274	1,510	..	10,551

Statement showing the revenue under different heads from Kurnool East Division.
(Figures given in number of rupees.)

Year.	Removed by Government agency. Timber.	Fire-wood and char-coal.	Sandal-wood.	Bamboo.	Other produce.	Removed by purchasers and consumers. Timber.	Fire-wood and char-coal.	Bamboo.	Grazing.	Minor forest produce.	Miscel-laneous (includes revenue from fines, forfei-tures, confis-cated produce, etc.).	*Deduct* refunds.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1928-29 ..	14,926	193	..	729	431	7,366	3,425	7,051	33,263	9,970	11,776	327	88,833
1929-30 ..	20,521	..	..	187	1	6,379	6,641	7,083	37,316	6,326	12,357	284	96,527
1930-31 ..	7,951	10	..	146	..	5,631	4,548	7,005	32,173	9,449	10,261	..	77,174
1931-32 ..	8,288	5	..	224	..	3,601	1,407	3,716	33,611	5,085	10,077	235	65,779
1932-33 ..	6,749	12	..	1,568	..	10,052	2,359	7,850	30,694	6,664	7,574	1,832	71,770
1933-34 ..	3,544	33	..	295	..	9,563	1,998	9,700	35,253	4,057	12,029	331	76,141
1934-35 ..	5,776	16	..	647	..	9,064	2,184	5,082	36,533	6,787	12,643	212	78,520
1935-36 ..	2,502	..	..	309	..	9,633	1,177	12,878	41,096	5,106	13,287	1	85,987
1936-37 ..	2,189	..	..	374	..	9,378	2,248	10,174	41,656	6,163	14,445	1	86,626
1937-38 ..	4,222	23	..	179	1	9,389	2,748	6,030	39,341	7,542	13,195	59	82,611

255. Statement showing past expenditure rangewar (figures given in number of rupees).

Year.	Conservancy and Works. Exploitation by Government agency. Timber.	Firewood and charcoal.	Sandalwood.	Bamboo.	Other produce.	Consumers and purchasers.	Livestock stores, tools and plants.	Confiscated produce refund and drawbacks.	Communications and buildings. Roads and bridges.	Buildings.	Other works.	Organization and improvement of forests. Survey and demarcation.	Sowing and planting.	Fire protection.	All other charges.	Chenchu works.	Total conservancy and works.	Establishment. District establishment. Pay and allowances.	Contingent charges.	Chenchu establishment. Pay and allowances.	Contingent charges.	Total establishment.	Grand total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
										DORNAL RANGE.													
1928-29	1,208	..	..	418	89	928	28	..	1,079	1,570	86	210	254	194	176	123	6,363	14,152	747	1,915	1,712	18,526	24,889
1929-30	1,670	..	..	..	..	1,377	58	..	971	804	337	164	212	418	442	81	6,534	13,867	678	1,874	1,541	17,960	24,494
1930-31	904	..	..	..	..	1,289	20	..	1,209	599	606	154	54	420	106	580	5,941	13,023	667	2,659	1,301	17,650	23,591
1931-32	713	..	..	..	..	1,340	13	..	607	432	276	155	417	396	136	299	4,784	14,227	677	4,222	1,455	20,581	25,365
1932-33	1,563	..	..	1	..	1,353	28	..	719	631	7	140	243	115	153	38	4,991	13,945	711	3,429	1,434	19,519	24,510
1933-34	362	..	..	1	..	1,212	15	..	1,501	1,260	21	156	461	274	100	..	5,363	13,421	569	3,457	1,342	18,789	24,152
1934-35	664	..	..	..	..	1,133	32	..	1,368	536	56	154	347	98	55	77	4,520	13,739	689	3,474	1,704	19,606	24,126
1935-36	403	..	..	..	..	1,153	47	..	2,116	1,078	87	138	303	167	56	62	5,610	14,412	783	2,356	1,090	18,641	24,251
1936-37	488	..	..	..	..	1,188	63	..	2,336	913	26	81	189	200	..	51	5,535	12,255	610	2,469	1,189	16,523	22,058
1937-38	488	..	..	..	..	1,178	43	..	1,923	929	14	34	194	198	46	22	5,069	13,150	740	2,554	1,170	17,614	22,683
										GUNDLAKAMMA RANGE.													
1928-29	779	..	..	..	..	..	7	..	307	734	..	..	181	195	..	..	2,203	11,463	163	..	..	11,626	13,829
1929-30	3,870	..	..	..	..	941	..	..	460	234	1,871	..	20	174	..	..	7,570	17,658	395	..	..	18,053	25,623
1930-31	3,022	..	..	..	..	962	20	..	226	365	1,420	..	43	150	..	..	6,208	13,585	259	..	..	13,844	20,052
1931-32	1,611	..	..	..	..	937	10	..	381	299	..	120	28	78	5	..	3,469	16,600	140	..	..	16,740	20,209
1932-33	198	..	..	..	..	808	44	..	1,443	289	40	30	99	245	15	..	3,211	11,905	156	..	..	12,061	15,272
1933-34	633	..	..	..	..	806	13	..	1,414	539	10	..	159	199	5	..	3,778	10,838	166	..	..	11,004	14,782
1934-35	842	..	..	..	..	805	26	..	1,300	632	10	12	201	100	10	..	3,938	11,476	205	..	..	11,681	15,619
1935-36	115	..	..	..	..	835	25	..	1,608	428	16	51	141	190	13	..	3,422	11,618	137	..	..	11,755	15,177
1936-37	334	..	..	..	..	815	44	..	1,780	1,404	..	1	109	115	192	..	4,794	11,796	163	..	..	11,959	16,753
1937-38	312	..	..	..	..	864	3	..	1,148	2,827	641	25	136	139	62	..	6,157	11,699	175	..	..	11,874	18,031
										GIDDALUR RANGE.													
1928-29	7	..	..	..	..	..	..	..	108	167	26	47	27	68	229	..	679	8,191	205	..	..	8,396	9,075
1929-30	96	..	..	..	..	2,245	15	..	69	70	..	12	..	61	459	..	3,027	15,466	58	..	..	15,524	18,551
1930-31	82	..	..	..	..	2,097	..	..	123	284	26	5	5	85	50	..	2,757	14,246	250	..	..	14,496	17,253
1931-32	115	..	..	..	..	1,970	52	..	80	201	58	..	21	69	7	..	2,573	14,660	103	..	..	14,763	17,336
1932-33	65	..	..	..	..	1,637	61	..	657	397	5	41	59	55	67	..	3,044	13,241	157	..	..	13,398	16,442
1933-34	418	..	..	..	..	1,245	12	..	260	266	85	21	154	87	38	..	2,586	13,045	197	..	..	13,242	15,828
1934-35	..	..	..	..	..	1,742	3	..	192	249	5	101	168	59	39	..	2,558	13,456	187	..	..	13,643	16,201
1935-36	..	..	..	..	..	1.816	6	..	299	1,107	71	22	105	72	42	..	3,540	15,886	242	..	..	16,128	19,668
1936-37	..	..	..	..	..	1,825	4	..	319	433	3	..	100	50	3	..	2,737	16,312	307	..	..	16,619	19,356
1937-38	..	..	..	..	..	1,763	8	..	276	128	9	..	213	52	41	..	2,490	17,877	609	..	..	18,486	20,976

Year.	Conservancy and Works. Exploitation by Government agency.								Communications and buildings.			Organization and improvement of forests.						Establishment. District establishment.		Chenchu establishment.			
	Timber.	Firewood and charcoal.	Sandalwood.	Bamboo.	Other produce.	Consumers and purchasers.	Livestock stores, tools and plants.	Confiscated produce refund and drawbacks.	Roads and bridges.	Buildings.	Other works.	Survey and demarcation.	Sowing and planting.	Fire protection.	All other charges.	Chenchu works.	Total conservancy and works.	Pay and allowances.	Contingent charges.	Pay and allowances.	Contingent charges.	Total establishment.	Grand total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
GANJIVARIPALLY RANGE.																							
1928–29	159	..	..	54	..	774	12	..	654	256	..	120	347	48	50	37	2,511	8,939	649	691	229	10,508	13,019
1929–30	124	..	..	119	..	949	58	..	325	340	95	138	..	315	4,567	35	7,065	19,452	693	617	297	21,059	28,124
1930–31	146	..	..	77	..	926	27	..	381	107	16	125	..	269	1,533	50	3,657	8,391	712	308	379	9,790	13,447
1931–32	250	..	..	100	..	1,005	20	..	399	224	..	117	..	245	144	205	2,709	9,444	703	2,114	913	13,174	15,883
1932–33	180	..	..	127	..	617	25	..	461	734	39	125	..	219	102	12	2,641	10,449	759	1,767	986	13,961	16,602
1933–34	304	..	..	178	..	712	15	..	723	455	7	124	1	235	226	..	2,980	9,203	682	1,883	769	12,737	15,717
1934–35	282	..	..	392	..	717	14	..	676	289	20	125	..	125	103	68	2,811	9,031	739	2,005	1,304	13,079	15,890
1935–36	293	..	..	189	..	734	50	..	1,113	420	17	105	1	182	78	..	3,182	11,053	867	656	368	12,944	16,126
1936–37	220	..	..	188	..	699	49	..	682	477	34	33	1	140	78	240	2,841	10,247	780	650	369	12,046	14,887
1937–38	291	..	..	101	..	651	28	..	1,192	375	24	5	..	140	14	..	2,821	10,561	772	591	418	12,342	15,163
TURIMELLA RANGE.																							
1928–29	491	9	..	..	151	1,337	12	..	216	288	159	302	71	56	331	..	3,423	10,613	476	365	167	11,621	15,044
1929–30	128	..	..	..	..	1,750	58	..	161	313	740	297	11	46	153	38	3,695	12,391	637	369	134	13,531	17,226
1930–31	183	..	..	..	..	1,867	20	..	126	177	..	232	43	113	40	11	2,812	11,849	646	384	261	13,140	15,952
1931–32	112	..	..	..	..	1,569	13	..	151	233	16	206	148	53	164	..	2,665	11,276	659	1,835	639	14,409	17,074
1932–33	217	..	..	735	..	1,100	27	..	207	221	..	199	49	56	45	12	2,868	13,269	680	1,475	725	16,149	19,017
1933–34	25	..	..	..	..	1,251	15	..	127	154	9	202	93	68	50	..	1,994	11,436	657	1,631	672	14,396	16,390
1934–35	245	..	..	..	..	1,143	14	..	385	152	32	125	73	17	10	..	2,196	10,946	905	1,718	1,041	14,610	16,806
1935–36	..	..	..	..	..	1,170	32	..	539	193	3	105	66	86	5	..	2,199	11,149	846	389	189	12,573	14,772
1936–37	99	..	..	..	..	1,146	14	..	833	302	25	6	59	89	10	15	2,598	10,540	714	396	212	11,862	14,460
1937–38	..	..	..	..	..	1,240	..	..	567	243	8	10	91	46	36	..	2,241	13,761	359	..	..	14,120	16,361
MARKAPUR RANGE.																							
1928–29	65	..	..	..	..	852	210	..	208	68	15	120	..	..	..	41	1,579	9,132	689	384	165	10,370	11,949
1929–30	..	..	..	..	..	1,115	67	..	45	36	5	138	..	..	..	43	1,449	8,346	829	319	146	9,640	11,089
1930–31	..	..	..	..	..	1,195	20	..	..	54	19	130	..	..	125	..	1,543	8,035	856	..	..	8,891	10,434
1931–32	..	..	..	..	..	1,275	13	..	..	..	26	117	..	..	82	..	1,513	8,710	684	1,480	482	11,356	12,869
1932–33	6	60	..	..	..	765	21	..	..	17	21	116	..	..	..	12	1,018	9,905	703	1,103	569	12,280	13,298
1933–34	..	..	..	..	..	810	15	..	..	31	..	134	1	..	..	..	991	7,670	687	1,331	491	10,179	11,170
1934–35	..	..	..	..	..	804	14	..	..	25	45	126	2	..	..	..	1,026	8,671	762	1,579	989	12,001	13,027
1935–36	..	..	..	..	..	786	6	..	117	41	1	106	14	..	41	208	1,320	8,130	981	481	233	9,825	11,145
1936–37	..	..	..	20	..	819	8	..	120	61	..	7	1	..	59	17	1,112	8,390	872	492	267	10,021	11,133
1937–38	..	..	..	..	..	793	70	..	111	62	11	18	..	..	95	524	1,684	9,072	925	492	277	10,766	12,450
Statement showing the expenditure incurred in Kurnool East Division during the past ten years. (Figures given in number of rupees.)																							
1928–29	2,709	9	..	472	240	3,891	269	..	2,572	3,083	286	799	880	561	786	201	16,758	62,490	2,929	3,355	2,273	71,047	87,805
1929–30	5,888	..	..	119	..	8,377	256	..	2,031	1,797	3,048	749	243	1,014	5,621	197	29,340	87,180	3,290	3,179	2,118	95,767	1 25,107
1930–31	4,337	..	..	77	..	8,336	107	..	2,065	1,586	2,088	646	144	1,037	1,854	641	22,918	69,129	3,390	3,351	1,941	77,811	1,00,729
1931–32	2,801	..	..	100	..	8,096	121	..	1,618	1,388	376	715	615	841	538	504	17,713	74,917	2,966	9,651	3,489	91,023	1,08,736
1932–33	2,299	60	..	863	..	6,280	205	..	3,487	2,289	112	651	450	691	382	74	17,773	72,714	3,166	7,774	3,714	87,368	1,05,141
1933–34	1,742	..	..	179	..	6,036	85	..	4,025	2,705	132	637	869	863	419	..	17,692	65,613	2,958	8,302	3,474	80,347	98,039
1934–35	2,033	..	..	392	..	6,343	103	..	3,922	1,883	168	643	800	399	217	145	17,049	67,319	3,488	8,776	5,038	84,621	1,01,669
1935–36	811	..	..	189	..	6,493	166	..	5,792	3,268	195	526	630	698	235	270	19,273	72,248	3,855	3,882	1,880	81,865	1,01,138
1936–37	1,141	..	..	208	..	6,493	181	..	6,070	3,590	88	128	459	594	342	323	19,617	69,540	3,446	4,007	2,037	79,030	98,647
1937–38	1,091	..	..	101	..	6,489	152	..	5,217	4,564	707	92	634	575	294	546	20,463	76,120	3,580	3,637	1,865	85,202	1,05,664
Total ..	24,782	69	..	2,700	240	66,834	1,645	..	36,799	26,153	7,200	5,586	5,724	7,273	10,688	2,901	1,98,596	7,17,270	33,068	55,914	27,829	8,34,081	10,32,675

256. Profit and Loss Statement, rangewar and for the Division (figures given in rupees).

Year.	Dornal Range. Revenue.	Dornal Range. Expenditure.	Dornal Range. Surplus.	Dornal Range. Deficit.	Gundlakamma Range. Revenue.	Gundlakamma Range. Expenditure.	Gundlakamma Range. Surplus.	Gundlakamma Range. Deficit.
1928–29	16,768	24,889	..	8,121	15,977	13,829	2,148	..
1929–30	11,667	24,494	..	12,827	23,751	25,623	..	1,872
1930–31	10,568	23,591	..	13,023	15,673	20,052	..	4,379
1931–32	6,822	25,365	..	18,543	14,022	20,209	..	6,187
1932–33	11,778	24,510	..	12,732	13,773	15,272	..	1,499
1933–34	13,192	24,152	..	10,960	13,455	14,782	..	1,327
1934–35	10,256	24,126	..	13,870	10,793	15,619	..	4,826
1935–36	18,073	24,251	..	6,178	13,372	15,177	..	1,805
1936–37	16,451	22,058	..	5,607	13,069	16,753	..	3,684
1937–38	14,913	22,683	..	7,770	10,145	18,031	..	7,886
Total ..	**1,30,488**	**2,40,119**	..	**1,09,631**	**1,44,030**	**1,75,347**	..	**31,317**
Average ..	**13,049**	**24,012**	..	**10,963**	**14,403**	**17,535**	..	**3,132**

Year.	Giddalur Range. Revenue.	Giddalur Range. Expenditure.	Giddalur Range. Surplus.	Giddalur Range. Deficit.	Ganjivaripalli Range. Revenue.	Ganjivaripalli Range. Expenditure.	Ganjivaripalli Range. Surplus.	Ganjivaripalli Range. Deficit.
1928–29	22,688	9,075	13,613	..	6,445	13,019	..	6,574
1929–30	25,108	18,551	6,557	..	6,994	28,124	..	21,130
1930–31	19,362	17,253	2,109	..	6,224	13,447	..	7,223
1931–32	14,759	17,336	..	2,577	8,586	15,883	..	7,297
1932–33	17,644	16,442	1,202	..	8,863	16,602	..	7,739
1933–34	17,838	15,828	2,010	..	10,059	15,717	..	5,658
1934–35 .. .	19,944	16,201	3,743	..	12,510	15,890	..	3,380
1935–36	20,496	19,668	828	..	13,116	16,126	..	3,010
1936–37	20,981	19,356	1,625	..	12,041	14,887	..	2,846
1937–38	19,452	20,976	..	1,524	11,658	15,163	..	3,505
Total ..	**1,98,272**	**1,70,686**	**27,586**	..	**96,496**	**1,64,858**	..	**68,362**
Average ..	**19,827**	**17,069**	**2,758**	..	**9,650**	**16,486**	..	**6,836**

Year.	Turimella Range. Revenue.	Turimella Range. Expenditure.	Turimella Range. Surplus.	Turimella Range. Deficit.	Markapur Range. Revenue.	Markapur Range. Expenditure.	Markapur Range. Surplus.	Markapur Range. Deficit.
1928–29	17,228	15,044	2,184	..	9,727	11,949	..	2,222
1929–30	19,148	17,226	1,922	..	9,859	11,089	..	1,230
1930–31	14,082	15,952	..	1,870	11,265	10,434	831	..
1931–32	12,318	17,074	..	4,756	9,272	12,869	..	3,597
1932–33	12,081	19,017	..	6,936	7,631	13,298	..	5,667
1933–34	13,922	16,390	..	2,465	7,675	11,170	..	3,495
1934–35	15,568	16,806	..	1,238	9,449	13,027	..	3,578
1935–36	13,274	14,772	..	1,498	7,656	11,145	..	3,489
1936–37	16,269	14,460	1,809	..	7,815	11,133	..	3,323
1937–38	15,892	16,361	..	469	10,551	12,450	..	1,899
Total ..	**1,49,782**	**1,63,102**	..	**13,320**	**90,900**	**1,18,564**	..	**27,664**
Average ..	**14,978**	**16,310**	..	**1,332**	**9,090**	**11,756**	..	**2,766**

Year.	Whole division. Revenue.	Whole division. Expenditure.	Whole division. Surplus.	Whole division. Deficit.
1928–29 ..	88,833	87,805	1.078	..
1929–30 ..	96,527	1,25,107	..	28,580
1930–31 ..	77,174	1,00,729	..	23,556
1931–32 ..	65,779	1,08,736	..	42,957
1932–33 ..	71,770	1,05,141	..	33,371
1933–34 ..	76,141	98,039	..	21,898
1934–35 ..	78,520	1,01,669	..	23,151
1935–36 ..	85,987	1,01,139	..	15,152
1936–37 ..	86,626	98,647	..	12,021
1937–38 ..	82,611	1,05,664	..	23,055
Total ..	**8,09,968**	**10,32,676**	..	**2,22,708**
Average ..	**80,997**	**1,03,268**	..	**22,271**

CHAPTER VI.—STATISTICS OF GROWTH AND YIELD.

SECTION 1.—STATISTICS COLLECTED BY THE WORKING PLANS STAFF.

257. *Bamboo sample plots.*—The bamboo areas of the division have been stockmapped by ocular estimate into two density classes, viz., dense and sparse, the former consisting of areas with more than 50 and the latter 50 or less clumps per acre. The distribution of the two species of bamboo has been differentiated in the stockmaps. A number of one-acre sample plots were marked on the stockmaps and then laid out on the ground and complete enumeration of the number of clumps, and the number of healthy, dead and new culms was

carried out. The results are recorded. The plots were laid out in *Dendrocalamus* areas only as *Bambusa* has flowered gregariously.

Range.	Series.	Density.	Number of clumps.	Number of culms. Mature.	Dead.	New.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dornal ..	Peddachama	Dense ..	181	3,118	1,654	64	4,836
		Sparse ..	40	1,259	481	178	1,918
		Dense ..	264	3,199	1,165	91	4,455
		Sparse ..	48	967	147	173	1,287
	Peddamantrala ..	Dense ..	130	1,407	415	153	1,975
		Sparse ..	44	834	98	99	1,031
		Dense ..	130	1,862	2,264	316	4,442
		Sparse ..	43	645	661	42	1,348
	Chinnamantrala ..	Dense ..	150	2,042	585	370	2,997
		Sparse ..	44	945	271	130	1,346
		Dense ..	163	1,543	1,791	265	3,599
		Sparse ..	48	455	543	95	1,093
	Chilakacherla ..	Dense ..	216	1,650	520	216	2,386
Ganjivaripalli.	Nekkanti	Dense ..	87	1,439	977	405	2,821
		Dense ..	86	1,730	704	410	2,844
		Dense ..	72	975	628	301	1,904
		Sparse ..	35	767	337	187	1,291
		Total, 17 acres ..	**1,781**	**24,837**	**13,241**	**3,495**	**41,573**

258. *Teak.*—Measurements of height and girth of dominant trees in the teak plantations of Peddachama and Peddamantrala were recorded by the working plans party and the results are abstracted in the following statement :—

Name of plantation.	Area in acres.	Year of planting.	Number of trees measured.	Girth classes. 12″—18″.	18″—24″.	24″—30″.	30″—36″.	36″—42.″	Over 42″.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				TREES.	TREES.	TREES.	TREES.	TREES.	TREES.
Peddachama	46·75	1916	111	4	37	44	13	9	4
		Average height.		45	50	56	62	64	72
Peddamantrala	13·75	1916	57	6	14	19	13	5	..
		Average height.		37	43	52	60	63	..

An enumeration of all the teak trees in the plantations was done by the district staff in 1936 and the results are recorded below :—

Name of plantation.	Girth classes. Below 6″.	6″—12″.	12″—18″.	18″—24″.	24″—30″.	30″—36″.	36″—42″.	42″—48″.	48″—54″.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Peddachama 46·75 acres	173	953	970	477	118	39	7	6	1
Peddamantrala 13·75 acres ..	134	331	522	337	98	25	5	..	..

259. *Ring countings on Teak.*—Ring countings on five sound teak stumps in the Iskagundam plateau were done by the working plans staff, the results were tabulated and plotted. The girth increment figures as read from the curve are exhibited below. The mean annual girth increment would appear to culminate at the age of about 55 years, but under plantation conditions the culmination point is likely to be earlier—

Age in years.	Girth in inches.	Mean annual girth increment in inches.	Age in years.	Girth in inches.	Mean annual girth increment in inches.
5 ..	3	·6	35 ..	24	·68
10 ..	6	·6	40 ..	29	·72
15 ..	9	·6	45 ..	35	·77
20 ..	12	·6	50 ..	40	·80
25 ..	16	·64	55 ..	45	·82
30 ..	20	·66	60 ..	48	·80

260. *Coppice measurements in pole coupes.*—Girth measurements of coppice regrowth in felled coupes of known age in each of the timber series in Gundlakamma and Giddalur ranges were recorded by the working plans party and the mean girth for each species and locality is given in the following statement :—

Age in years.	Locality (average girth in inches). Malakondapenta.	Vedurlakonda.	Iskagundam.	Sandrapodu.	Average for division.
(1)	(2)	(3)	(4)	(5)	(6)
		TEAK			
1	..	..	2·0	..	2·0
2	4·2	..	3·0	5·3	4·2
3	7·0	5·5	6·0	5·2	5·9
4	5·8	4·2	7·0	6·0	5·8
5	6·0 8·4	5·0	8·0	..	6·9
6	8·4 8·7	..	9·0	7·8	8·5
7	8·9 8·7	7·70	9·0	8·3	8·5
8	9·3	..	..	8·6	9·0
9	9·0 8·8	6·9	..	8·7	8·4
10	..	6·9	..	7·2	7·1
11	..	8·0	..	..	8·0
12	9·4	8·8	..	..	9·1
13	10·4	11·3	..	..	10·9

Age in years.	Locality (average girth in inches).				
	Malakondapenta.	Vedurlakonda.	Iskagundam.	Sandrapodu.	Average for division.
(1)	(2)	(3)	(4)	(5)	(6)
Pterocarpus marsupium.					
1	..	..	2·0	3·1	2·6
2	4·3	4·4	..	4·1	4·3
3	5·4	5·1	6·0	6·2	5·7
4	5·8	5·6	6·0	6·8	6·1
5	6·9 } 7·8 }	6·5	7·0	6·7	7·0
6	7·8 } 7·9 }	6·7	7·0	7·5	7·4
7	8·9 } 8·8 }	6·4	9·0	7·5	8·1
8	8·6 } 8·2 }	5·6	9·0	9·2	8·1
9	8·1 } 8·9 }	6·3	..	7·8	7·8
10	..	6·3	..	7·7	7·0
11	..	6·4	..	..	6·4
12	9·3	8·3	..	..	8·8
13	9·9	9·2	..	..	9·6
Terminalia tomentosa, Nallamaddi.					
1	..	..	2·0	3·5	2·8
2	4·2	4·1	3·0	4·2	3·9
3	5·0	4·8	6·0	5·8	5·4
4	5·5	4·8	6·0	6·8	5·8
5	6·5 } 7·1 }	6·2	6·0	7·0	6·6
6	7·0 } 7·1 }	6·8	7·0	6·3	6·8
7	7·7 } 7·4 }	6·8	8·0	8·9	7·8
8	7·8 } 7·5 }	5·9	9·0	9·1	7·9
9	7·5 } 7·2 }	6·6	..	8·2	7·4
10	..	6·9	..	7·4	7·2
11	..	7·5	..	..	7·5
12	8·2	8·1	..	..	8·2
13	9·4	8·8	..	..	9·1

The average figures for the whole division were plotted and the following readings have been recorded from the curves :—

Age in years.	Girth in inches.		
	Teak.	*Pterocarpus marsupium.*	*Terminalia tomentosa.*
1 ..	2·1	2·1	2·3
2 ..	4·2	4·2	3·9
3 ..	5·4	5·1	4·9
4 ..	6·3	5·9	5·6
5 ..	7·0	6·5	6·2
6 ..	7·6	7·0	6·7
7 ..	8·0	7·5	7·2
8 ..	8·4	7·9	7·7
9 ..	8·9	8·3	8·0
10 ..	9·3	8·7	8·3
11 ..	9·6	9·0	8·7
12 ..	9·9	9·3	8·9
13 ..	10·0	9·5	9·1

261. *Coppice measurements in fuel coupes.*—Girth measurements of coppice shoots in felled fuel coupes of known age were recorded by the working plans party and the abstracts are embodied in the appended statement. The average figures for the division were plotted and figures were read from the curve drawn.

Species.	Age.	Girth in inches.				
		Veerareddikunta series.	Chintalapalli series.	Yerragundla series.	Mallalamma series.	Average.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Yepi (*Hardwickia binata*).	1	..	1·8	2·3	2·7	2·3
	2	4·7	4·2	4·8	4·0	4·4
	3	5·0	5·1	5·1	6·10	5·3
	4	5·8	5·4	5·5	7·0	5·9
	5	6·8	5·1	7·5	7·5	6·7
	6	6·1	4·9	4·9	..	5·3
	7	Nil.	..	..	..	..
	8	7·3	4·5	..	..	5·9
	9	..	..	..	9·2	9·2
	10	..	4·8	7·1	7·4	6·4
	11	..	4·2	..	10·0	7·1
	12	6·5	..	..	..	6·5
	13	6·8	8·6	9·7	..	8·4
	14	..	..	..	12·2	12·2
	15	..	..	..	12·0	12·0
Chirumanu (*Anogeissus latifolia*).	1	..	1·9	2·2	2·5	2·2
	2	3·9	3·4	4·0	3·1	3·6
	3	3·9	4·0	4·2	4·0	4·0
	4	4·0	4·3	4·6	4·4	4·3
	5	3·9	4·3	4·7	4·7	4·4
	6	4·2	4·4	3·9	..	4·2
	7	..	..	..	..	..
Chirumanu (*Anoegissus latifolia*)—cont.	8	5·6	5·7	..	..	5·6
	9	..	..	..	5·0	5·0
	10	..	5·3	5·0	6·5	5·6
	11	..	4·2	..	6·6	5·4
	12	4·8	..	5·1	..	5·0
	13	5·3	4·9	5·5	..	5·3
	14	..	..	..	8·3	8·3
	15	..	..	..	9·0	9·0
Red sanders (*Pterocarpus santalinus*).	1		2·1	2·8	..	2·5
	2	4·6	..	5·1	..	4·9
	3	5·4	..	5·4	..	5·4
	4	5·1	..	5·6	..	5·4
	5	4·9	10·0	6·1	..	7·0
	6	5·4	..	5·3	..	5·4
	7	..	..	..	..	..
	8	8·0	..	..	..	8·0
	9	..	..	..	..	..
	10	..	..	5·4	..	5·4
	11	..	..	..	..	..
	12	7·1	..	6·2	..	6·6
	13	7·5	..	6·9	..	7·2

Readings from the curves—

Age in years.	Girth in inches. *Hardwickia binata.*	Girth in inches. *Anogeissus latifolia.*	Age in years.	Girth in inches. *Hardwickia binata.*	Girth in inches. *Anogeissus latifolia.*
1 ..	2·3	1·9	9 ..	8·2	5·7
2 ..	3·7	2·8	10 ..	8·7	6·0
3 ..	46	3·4	11 ..	9·3	6·3
4 ..	5·4	3·9	12 ..	9·8	6·6
5 ..	6·1	4·4	13 ..	10·3	7·0
6 ..	6·7	4·7	14 ..	11·0	7·4
7 ..	7·3	4·9	15 ..	11·6	7·9
8 ..	7·8	5·4	16 ..	12·1	8·2

SECTION 2.—STATISTICS COLLECTED BY DISTRICT STAFF.

262. An area of two acres in Vedullacheruvu reserved forest at the foot of Polika Bodu was selected by the district staff in 1928. All hollow, unsound, crooked and insect attacked trees of superior species such as *Pterocarpus santalinus, Hardwickia binata, Anogeissus latifolia* and *Chloroxylon swietenia* were coppiced and all trees of inferior species interfering with the superior species were removed. In all 342 trees were removed and 205 were retained. Annual measurements of girth at breast-height of each tree retained were recorded.

The object of the plot is—

(*a*) to obtain reliable data regarding the height and girth increment of the species;

(*b*) to find out the rate of growth of coppice shoots; and

(*c*) to compare the rate of growth of coppice by retaining only one shoot at each stool.

Measurements recorded by the district staff were inaccurate in several instances, as later measurements showed less than original measurements. No conclusive results have been obtained but the following general observations may be of interest:—

(*a*) The average annual increment of the red sanders standards is ·7 to 1 inch in girth and 1 to 1½ feet in height;

(*b*) the rate of coppice regrowth is about ½ to ¾ inch in girth and ½ to 1½ feet in height per annum;

(*c*) the rate of growth of the most vigorous shoot at a stool varies from ½ to 2 inches in girth and 3¾ to 5 feet in height.

SECTION 3.—EXPERIMENTS.

263. *Pterocarpus marsupium planting.*—An experimental plot near Rollapenta was opened in 1935 with the object of ascertaining—

(*a*) the most suitable date for stump planting;

(*b*) the size of the stump suitable for planting; and

(*c*) the effect of keeping areas closed or open to grazing.

The scheme of planting was undertaken in collaboration with the Provincial Silviculturist. The area was clearfelled and burnt. Stumps of assorted sizes were supplied periodically by the Provincial Silviculturist from the Wynaad Division. Planting was done every fortnight commencing from May 1935. Unfortunately the first two batches of stumps were planted upside down by the local staff who had no experience in stump planting. The defect was remedied in later plantings. Further some intermediate sowings and plantings appear to have been done. The experiment indicates that—

(*a*) July is the most suitable time for stump planting;

(*b*) big stumps appear to give better results than small one; and

(*c*) no appreciable difference is noticeable between the open and closed plots.

The plot is well stocked with healthy, vigorous *Pterocarpus marsupium* saplings but some damage has been caused to the leading shoots with the result that many of the saplings have double leaders.

264. *Mahogany.*—An area of about one acre near the Mogilutla inspection shed in Dornal Range was cleared of all bamboos and undergrowth and burnt in 1935. Subsequently all standing growth was removed. Five pounds of seeds of mahogany were received from Nilambur. Some seeds were sown in a nursery bed within the area. The area was ploughed at a cost of Rs. 14. Mahogany seeds were dibbled at an espacement of 9′ by 9′ in October 1935. Some transplanting has also been done but there is no record of it. Germination and development were quite satisfactory but in the following hot weather many of the seedlings withered and died. There were three hundred

healthy well-grown seedlings early in 1937 but most of these withered and died during that hot weather. At the time of inspection by the working plans staff there were only 27 left in the nursery bed. Probably mahogany requires some broken shade in its infancy.

265. *Experiments.*—The following is a list of experimental, and sample plots opened in the division in the recent past; most of them have been abandoned, except plots 25 and 27 in the Gundlakamma range which have been ordered to be maintained as preservation plots. In many cases no conclusions were arrived at and in others information is not available as to the final observations on the experiment. Plot files have not been maintained in a systematic manner.

Serial number. (1)	Number of the plot. (2)	Area in acres. (3)	Locality. (4)	Object. (5)	Conclusions. (6)
			Gundlakamma Range.		
1	2	10	Diguvametta ..	Dibbling and basket sowing of sandal.	No information.
2	3	25	Malakondapenta ..	Effect of early burning on teak regeneration.	Do.
3	4	18	Iskagundam ..	Natural regeneration in clear felled timber forest under different treatments.	In 1936, all the plots are reported to have looked alike and no conclusions could be arrived at.
4	5	5	Do. ..	Stump planting in blanks in felled timber coupes.	No information.
5	6	2	Do. ..	Sowing in blanks in timber coupes.	Do.
6	7	1	Do. ..	Effect of fire protection and early burning on regeneration.	Do.
7	25	..	Do. ..	Girth increment plot in timber area.	Measurements were taken in 1927 and 1932 and 1937. To be preserved.
8	26	..	Do. ..	Girth increment plot in timber area.	Measurements were taken in 1927 and 1932 and 1937. Abandoned.
9	27	34	Do. ..	Girth increment plot in pole area.	Measurements were recorded in 1927 and 1932 and 1937. To be preserved.
10	30	1	Do. ..	Artificial regeneration in a belt of forest.	No record.
11	34	$\frac{1}{4}$	Do. ..	Artificial regeneration	Do.
12	35	1	Do. ..	Rab sowing	Do.
13	38A	6 trees.	Do. ..	Natural regeneration under mother trees of *Terminalia tomentosa.*	Do.
14	..	20′ 20′	Diguvametta ..	Experimental sowing and ploughing of *Givotia rottleriformis* to study germination results and rate of growth.	In 1934 about 231 plants were existing and looked fairly luxurious.
15	..	20 patches.	Malakondapenta timber coupe 7.	To find out the difference in girth of seedling on rab patches and on ordinary patches on which no burning was done.	No conclusions.
16	..	..	Malakondapenta near the draw well.	To find out germination of teak seeds from different localities.	No conclusion; untreated Nallamalai seeds appear to have given higher percentage.
17	..	$\frac{1}{2}$	Iskagundam ..	Early stump planting of teak ..	Middle of June gave good results.
			Turimella Range.		
1	17	1	Maddipenta ..	Dibbling red sanders seeds under the shade of bamboos.	No information available.
2	18	1	Do. ..	Regeneration of ebony under the shade of bamboos.	Do.
3	19	1	Do. ..	Dibbling *Pterocarpus marsupium* seeds under shade of bamboos.	Do.
4	20	1	Do. ..	Dibbling seeds of soapnut under the shade of bamboos.	Do.
5	21	1	Do. ..	Dibbling *Terminalia tomentosa* seeds in the open.	Do.
6	22	$1\frac{1}{4}$	Do. ..	Stumping natural teak seedlings.	Do.
7	23	1	Do. ..	Stumping natural rose-wood seedlings.	Do.
			Giddalur.		
1	..	$3\frac{1}{2}$	Uyyalavada R.F. ..	Regeneration of blanks in hard baked soil by ploughing alone and by ploughing and sowing seeds of fuel species.	*Cassia siamea* sown is doing fairly well.

PART II

Future Management discussed and prescribed.

CHAPTER I.—BASIS OF PROPOSALS.

SECTION 1.—GENERAL OBJECTS OF MANAGEMENT.

266. *Scope and objects.*—This working plan deals with the entire forest division of Kurnool East as it is at present constituted. The objects of management are :—

(*a*) To exploit the forests with due regard to silvicultural principles for timber, fuel, bamboo and minor forest produce so as to produce revenue to the State.

(*b*) To supply the agricultural and domestic needs of the local population in respect of smaller timber, firewood, manure leaves, bamboos, etc.

(*c*) To provide, conformably with principles of conservancy, for the pastoral needs of local and foreign cattle and, where possible, to improve existing pastures.

(*d*) To satisfy the demands of the local population for expansion of cultivation in suitable areas inside reserved forests by a system of ' kumri ' *cum* pasture improvement.

(*e*) To protect and conserve, as far as practicable, the forest growth for the realization of its indirect benefits and in the interests of agriculture and water-supply.

(*f*) To concert measures for the amelioration of the condition of the Chenchus.

SECTION 2.—METHODS OF TREATMENT ADOPTED.

267. *Methods of treatment.*—The details of the methods of treatment adopted in order to achieve the above objects of management are discussed and prescribed under the respective working circles. Exploitation will be regulated generally on an area basis in respect of timber, small timber, fuel, bamboos and manure leaves. Natural regeneration will be supplemented, as far as funds permit, by intensive ' rab ' regeneration and by creating plantations on suitable sites in compact areas. Grazing will be controlled by the issue of permits; watering facilities in penta sites will be improved; rotational burning will be done in plateau areas; experiments in rotational grazing will be organized; the raising of pastures in reserved forests bordering on cultivation in combination with agriculture will be undertaken both as a measure of reclaiming rapidly deteriorating grazing grounds and as a measure of providing land for expansion of cultivation for which there is a widespread demand. Minor forest produce will be exploited by range units. The raising of forest crops in combination with agriculture will be undertaken in the vicinity of Chenchu gudems both as a measure of regeneration and for providing the Chenchus with a field for agricultural practice. Expansion of cultivation by the Chenchus under the guidance of the forest staff will be undertaken.

268. *Agency of exploitation.*—The ideal aimed at will be to exploit all produce through the agency of contractors. The ' permit system ' will be abandoned except in the case of grazing and the collection of grass fodder. Chenchu labour will be employed on all unskilled works connected with exploitation, regeneration and development unless they are definitely unsuited to any special work, in which case, village labour may be employed.

SECTION 3.—WORKING CIRCLES, THEIR AREA AND DISTRIBUTION, AND REASONS FOR THEIR FORMATION.

269. *Working circles.*—In pursuance of the above objects of management nine working circles are constituted. Each is discussed in the following chapters. The financial aspect of the plan showing the estimated cost of the operations and the anticipated revenue is dealt with in Chapter XIII. A summary of prescriptions is given at the end.

Statement showing the distribution of the working circles.

Working circles. (1)	Area in acres. (2)	Description. Range. (3)	Description. Reserve. (4)	Number of series. (5)	Reasons for formation. (6)
1 Timber ..	25,450	Gundlakamma.	Cumbum	4	To exploit large sized timber for supply to the local population.
2 Pole ..	13,936	Dornal ..	Do.	1	Supply of poles to the local population for a variety of purposes.
		Gundlakamma.	Do.	2	
		Giddalur ..	Uyyalavada ..	2	
3 Small timber.	44,086	Dornal	Cumbum	1	To supply the local population with small timber for agricultural purposes and for house construction.
			Markapur	2	
		Giddalur ..	Uyyalavada ..	1	
		Ganjivaripalli.	Markapur	2	
		Turimella ..	Cumbum and Eastern Nallamalai block 3.	1	
4 Softwood ..	54,973	Dornal ..	Cumbum and Markapur.	1	For supplying softwoods for the slate industry at Markapur.
		Gundlakamma.	Cumbum	1	
		Turimella ..	Do.	1	
5 Bamboo ..	284,301	Dornal ..	Cumbum and Markapur.	4	To exploit bamboos for the supply of local requirements as well as for export to neighbouring districts.
		Gundlakamma.	Cumbum	4	
		Giddalur ..	Uyyalavada and extensions and Veligondas.	4	
		Ganjivaripalli.	Markapur	2	
		Turimella	Cumbum and Eastern Nallamalai blocks.	2	
		Markapur ..	Cumbum and Eastern Nallamalai blocks.	1	
6 Fuel ..	27,511	Gundlakamma.	Cumbum	1	For supply of fuel to meet rural demands.
		Giddalur ..	Uyyalavada, Veligondas and Mundlapad.	7	
		Turimella ..	Eastern Nallamalai blocks 1 and 2, Cumbum, Ambavaram and Somidevipalli.	5	
7 Grazing ..	Entire division with the exception of small selected areas which may be closed for silvicultural reasons.				To provide grazing for local and foreign cattle and to improve grazing conditions in general.
8 Minor forest produce.	Entire division and such unreserves as are bordering on reserved forests.				To exploit the minor forest products both for local supply and for export to external markets.
9 Manure leaf.	3,605	Giddalur ..	Veligonda North extension.	1	For supply of leaf manure for wet cultivation near Cumbum and Markapur.
		Markapur ..	Eastern Nallamalai block 4.	1	

SECTION 4.—RECOMMENDATIONS OF THE ROYAL COMMISSION ON AGRICULTURE.

270. The recommendations of the Royal Commission on Agriculture, in so far as they relate to forest administration, have been borne in mind in drafting the prescriptions. Effect will be given to the recommendations as follows :—

Recommendation 1—"*Grass cutting should be encouraged as an alternative to grazing.*"—The right to cut and collect fodder grass throughout the division will be allowed free in head-loads, and a small fee will be levied on collection in cart-loads.

Recommendation 2—"*The grazing of inferior cattle in the reserves should be discouraged.*"—The present policy of Government does not permit any restriction of grazing either to the possibility of the forest or to the kind of cattle. Recent reduction in grazing fees is likely to result in greater influx of useless cattle. Under existing conditions, restriction of inferior cattle from grazing in the reserves is impracticable.

Recommendation 3—"*The intensity of grazing consistent with the proper development of the forest and the preservation of desirable grasses should be determined as soon as possible.*"—The limitation of grazing to the possibility of the forest is not possible as it conflicts with the policy of Government. Rotational grazing will be introduced on an experimental scale as the system claims to be beneficial both to the forest and for the grazing.

Recommendation 15—"*All shifting cultivation should be brought under control with a view to the practice being stopped wherever it is productive of harmful results.*"—Shifting cultivation is not practised locally in forest areas nor will such cultivation be allowed except when it is combined with the raising of tree crops and fresh pastures under departmental control.

SECTION 5.—PERIOD OF THE WORKING PLAN AND NECESSITY FOR INTERMEDIATE REVISION.

271. *Period of the plan.*—This plan will be in force for a period of ten years from the 1st April 1940. No intermediate revision will be necessary.

CHAPTER II.—WORKING PLAN FOR THE TIMBER WORKING CIRCLE.

SECTION 1.—GENERAL CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF THE VEGETATION.

272. *Objects.*—The objects of this working circle are—

(*a*) To exploit big timber from the timber areas on the Iskagundam plateau on silvicultural principles to produce revenue to the State.

(*b*) To exploit well-grown, mature, marketable timber of utility species which occur diffusely distributed in the midst of dense and scattered bamboo areas on the Iskagundam plateau and its extension southwards so as to produce revenue to the State, which otherwise may be lost by the natural decay and deterioration of the trees and, incidentally, to benefit the bamboo crop.

(*c*) Cart building is a lucrative local industry and some of the best timbers suitable for the purpose occur in remote areas on the Iskagundam plateau. Illicit felling of big trees for cart materials is rife in many localities and if the management fails to exploit the timber on an organized scale the timber thieves will do so, at any rate, to a certain extent.

273. *Constitution.*—This working circle comprises all areas on the Iskagundam plateau containing appreciable quantities of timber of marketable species which can be exploited on a remunerative basis. The timber species occur either pure or in mixture with bamboos. The inclusion of poor timber areas has been necessary in order to make the felling series compact and to have natural features as their boundaries.

274. *Felling series and area.*—The working circle has an aggregate area of 25,450 acres and has been divided into four felling series as detailed below. All the series lie in the Gundlakamma range.

Serial number and felling series.	Total area in acres.	Exploitable area in acres.	Non-exploitable area in acres.
1 Iskakundam	7,439	3,481	3,958
2 Obulesunipenta	6,049	2,052	3,997
3 Rakasipenta	5,690	4,552	1,138
4 Malakondapenta	6,272	3,292	2,980
Total ..	25,450	13,377	12,073

The existing working plan provides only for one series on a selection basis on the Iskagundam plateau with a total area of 2,440 acres on a felling cycle of 20 years. The average annual coupe is 122 acres. In addition to this, the extraction of timber from bamboo areas in the series of Malakondapenta and Tunnel has been prescribed under the Chelama Working Plan on a cycle of 30 years. The average annual coupes have been 74 and 83 acres, respectively. Therefore under the existing plans the exploitation of timber of large size was confined to an average area of 279 acres annually whereas the present plan contemplates exploitation over a larger area of 660 acres annually.

275. *Character of the vegetation.*—The Iskagundam and Obulesunipenta Felling Series consist of areas of superior deciduous forest of first, second and third qualities with bamboo along stream banks. The more important timber species composing the crop are *Terminalia tomentosa*, *Pterocarpus marsupium*, teak, rosewood, *Lagerstroemia parviflora*, *Anogeissus latifolia*, *Bassia latifolia*, *Adina cordifolia*, *Stephegyne parvifolia*, *etc.* Third quality areas consist of poor, open type of timber forests which will not lend themselves to exploitation on a selection basis. In the other two qualities mature trees occur scattered, middle girth classes preponderate, natural regeneration and poles of valuable species are moderately present and the canopy is nearly closed. Till 1904, extensive exploitation was done in these forests under the 'permit system' and thereafter improvement fellings of one kind or another were conducted. Besides, timber theft has been systematically going on in the past with the result the crop that is left behind contains scattered, exploitable trees and a fair amount of younger classes.

The felling series of Rakasipenta and Malakondapenta consist mostly of dense and sparse bamboo areas, and trees of superior species such as *Pterocarpus marsupium*, *Terminalia tomentosa*, teak, etc., occur scattered in the midst of bamboo clumps. Trees attain superior dimensions due to more favourable soil factors and are of comparatively cleaner habit owing to the presence of bamboos. Regeneration of superior timber species is scarce except in open patches where some is noticeable: middle girth classes are moderately represented.

SECTION 2.—ANALYSIS AND VALUATION OF THE CROP.

276. *Quality classes.*—At the time of preliminary stock-mapping of the areas by the Working Plans Party, superior deciduous areas were differentiated into two kinds, viz., areas that contain an appreciable quantity of teak and those that do not. Each kind was further differentiated into the following three quality classes which were formed arbitrarily to suit local conditions :—

Quality 1.—Areas containing trees of superior species with a height growth of 45 feet and above, and wherein the factors of the locality are suitable for clearfelling and planting.

Quality 2.—Areas containing trees of superior species with a height growth between 30 and 45 feet, and wherein selection fellings may be undertaken to derive revenue and to benefit the younger crop.

Quality 3.—Areas of poor open type of timber forests with trees less than 30 feet in height, wherein exploitation of big timber is neither possible nor desirable.

Timber areas in mixture with bamboos were also distinctively shown. These classes are shown on the detailed maps as exploitable area (consisting of qualities 1 and 2) and non-exploitable area (consisting of third quality and pure bamboo).

SECTION 3.—METHOD OF TREATMENT.

277. *System.*—Exploitation will be on a selection basis. No artificial regeneration will be undertaken in the series of Rakasipenta and Malakondapenta which consist of bamboo areas as none is considered necessary and the removal of the tree crop will benefit the bamboo crop. In the series of Iskagundam and Obulesunipenta artificial regeneration will be done by planting up small compact areas in suitable localities with valuable timber species to replace the trees exploited from the annual coupes.

278. *Exploitable species and sizes.*—Exploitation will be confined to the following species and sizes :—

Teak and *Lagerstrœmia parviflora*	4 feet and above in girth over bark at breast height.
Pterocarpus marsupium *Terminalia tomentosa* *Albizzia lebbeck* *Dalbergia latifolia*	4 feet 6 inches and above in girth over bark at breast height.
Adina cardifolia *Stphegyne parvifolia*	5 feet and above in girth over bark at breast height.
Bassia latifolia *Anogeissus latifolia*	3 feet and above in girth over bark at breast height.

Under the existing working plan for the Giddalur-Gundlakamma Ranges the girth limits for teak and *Pterocarpus marsupium* have been fixed at 4 feet 6 inches and 5 feet respectively, but in view of the fact that teak on the Nallamalais under natural conditions may be considered mature when the trees attain a girth of 4 feet at breast height, as is corroborated by ring countings, which indicate that the mean annual girth increment of teak culminates when the trees are about 48 inches in girth, reduced girth limits of 4 feet and 4 feet 6 inches, respectively, for teak and *Pterocarpus marsupium* have been adopted. Exploitation of timber from bamboo coupes under the present Chelama Working Plan is on a selection basis with a girth limit as low as 3 feet for all species except softwoods. This limit is considered low especially in view of the fact that timber trees in bamboo areas attain larger dimensions and are of cleaner habit due to superior soil factors. The exploitable girths have therefore been suitably raised. All dead trees irrespective of their size, provided they are marketable at a profit, will be exploited.

279. *Felling cycle.*—A felling cycle of 20 years is prescribed, based on administrative convenience. A shorter felling cycle will increase the area of the annual coupes to a size which cannot be managed efficiently. At the same time, it is recognized, that it would be expedient to go over the area as speedily as possible and have the fellings suitably distributed so as to extract the trees before they are smuggled away by timber thieves. The mean annual girth increment of teak is in the neighbourhood of 0·8 of an inch and trees of 3 feet in girth would attain the exploitable size in a period of 18 years. A felling cycle of 20 years is, therefore, adopted.

280. *Division into coupes.*—Ten coupes prescribed for exploitation during the period of this plan have been constituted with, as far as practicable, natural features as boundaries. Arbitrary lines have been adopted only where they were found absolutely necessary. Coupes are so constituted as to contain equal exploitable area in each and with an eye to extraction facilities. The arrangement of the coupes has been made on the basis of the maturity of the present crop. The felling series and the coupes are shown on the detailed maps (Survey of India, sheet numbers 18, 22, 27) 4 inches = 1 mile. Areas exploited in the past are distinctively shown with the year in which they were exploited. Coupes have been numbered serially from I to X in the three series of Obulesunipenta, Rakasipenta and Malakondapenta but in the case of the Iskagundam series the numbering has been done serially from XI, since ten coupes have been worked under the existing plan and it is considered desirable to continue the serial to avoid confusion of numbers.

281. *Yield.*—The yield will be regulated by area. An approximate forecast of the yield obtainable from each series based on the average yield obtained in the past from similar areas and also on impressions gained during the stockmapping of the areas is given below to serve more as a guide to the management than as a prescription. The yield has been calculated on the basis of the extent of the exploitable area in the first ten coupes of the series.

Serial number and name of series.	Average effective area in the annual coupe in acres.	Average forecast of yield per acre in cubic feet.	Total forecast of yield in cubic feet.
1 Iskagundam	175	30	5,250
2 Obulesunipenta	100	30	3,000
3 Rakasipenta	220	10	2,200
4 Malakondapenta	150	10	1,500
		Total ..	11,950

SECTION 4.—STATEMENT OF FELLINGS.

282. The following statement shows the sequence in which the fellings are to be done :—

Serial number and series.	Coupe number.	Area in acres. Exploitable area.	Non-exploitable area.	Total area.	Serial number and series.	Coupe number.	Area in acres. Exploitable area.	Non-exploitable area.	Total area.
(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
		ACS.	ACS.	ACS.			ACS.	ACS.	ACS.
1 Iskagundam ..	XI	190	432	622	3 Rakasipenta ..	I	214	76	290
	XII	182	165	347		II	216	102	318
	XIII	186	528	714		III	223	119	342
	XIV	174	28	202		IV	231	35	266
	XV	176	7	183		V	202	11	213
	XVI	189	121	310		VI	208	2	210
	XVII	136	168	304		VII	222	51	273
	XVIII	161	130	291		VIII	202	..	202
	XIX	188	330	518		IX	241	8	249
	XX	156	72	228		X	214	3	217
Total ..		1,738	1,981	3,719	Total ..		2,173	407	2,580
2 Obulesunipenta ..	I	96	35	131	4 Malakondapenta ..	I	140	363	503
	II	107	176	283		II	139	99	238
	III	100	53	153		III	140	104	244
	IV	112	228	340		IV	140	27	167
	V	111	177	288		V	139	107	246
	VI	106	128	234		VI	168	148	316
	VII	109	517	626		VII	130	132	262
	VIII	102	66	168		VIII	176	215	391
	IX	96	390	486		IX	151	120	271
	X	87	116	203		X	146	106	252
Total ..		1,026	1,886	2,912	Total ..		1,469	1,421	2,890

SECTION 5.—METHOD OF EXECUTING THE FELLINGS.

283. *Coupe*.—Annually one coupe in each series in the serial order mentioned above will be taken up for exploitation. The plan indicates the sequence of the coupes to be felled without allotting them to definite years. If, therefore, a coupe cannot be exploited during a year no deviation from the working plan is involved. The coupe, will however, be exploited in the following year, but, if for valid reasons to be recorded in the Control Journal, the coupe cannot be exploited at all, the next coupe may be taken up for exploitation.

284. *Demarcation*.—The coupe boundaries, as far as practicable, follow natural features. Regular demarcation of the annual coupe may therefore be unnecessary. Where artificial lines have been adopted it would suffice if a line 6 feet wide is cleared.

285. *Marking*.—Marking should be commenced in the month of November preceding the year of felling. All exploitable trees of the species and sizes mentioned above will be serially numbered and enumerated provided that of two exploitable trees within 100 feet of each other only one may be marked, in which case, the more vigorously growing tree should be retained. Obviously unsound and useless trees should not be marked for felling. The serial number of the tree, the species, its girth at breast height and the estimated length of workable bole will be recorded in the appropriate columns of the timber register at the time of marking. (When the tree is felled the length of the log, its mid-girth and the actual outturn obtained will be entered in the appropriate columns.) The number of the tree will be affixed at two places on its trunk, one at the base and the other at a height of four feet from ground level. Numbering will be done only on the eastern side of the trees so as to facilitate inspection and check. All dead trees which can be marketed at a profit will be marked for felling. Marking will be done by a subordinate not below the rank of a Ranger or a Forester trained at the Forest College ; in the latter case 10 per cent of the markings should be checked by the Range Officer. The marking and numbering should be completed before the end of January and estimates of probable outturn should be prepared.

286. *Deleted*.

287. *Climber cutting*.—At the time of marking a climber cutting will be done over the entire coupe by freeing trees, poles and saplings of valuable species from climbers and creepers.

288. *Thinnings.*—Congested patches of regeneration of valuable species will be suitably thinned out at the time of marking.

289. *Agency of fellings.*—Normally the marked trees will be sold in public auction to a contractor who will do the felling and marketing. The period of lease will be one year from the 1st of April. The contractor will be allowed to fell and remove whatever he wants out of the marked trees. Conversion at site will be allowed with the previous permission of the Range Officer but vigilant supervision will be required to ensure that no illicit fellings and conversion are done.

290. *Departmental exploitation.*—If contract enterprise is not forthcoming, departmental exploitation may be undertaken. As far as possible forward contracts should be entered into before undertaking departmental exploitation. Trees will be felled and converted with minimum wastage. Proper conversion and dressing is a task which requires skill. Squared logs will, it is believed, fetch better prices than round. Trees of teak and yegi (*Pterocarpus marsupium*) which are not likely to produce good logs or which are too remotely situated for extraction in the form of logs may be converted into spokes and felloes for which there is a good and ready demand. Sound, straight trees of *Terminalia tomentosa* may be converted into house pillars for which there is a ready demand. Top ends of trees may be converted into spokes and felloes. Matters relating to the conversion of trees require the personal attention of the District Forest Officer and market requirements should be studied periodically. Departmental exploitation, if undertaken, should be restricted strictly to market requirements, but normally the annual output from this working circle will be absorbed in the local markets.

291. *Extraction.*—Rough cart-tracks exist along valleys into the interior timber areas for present transport purposes but the possibilities of developing them and constructing new ones, where none exist at present, require consideration by the District Forest Officer. Suitable central points should be selected in each series and connected by cart-tracks to the main Iskagundam-Diguvametta road. The coupe contractor should be encouraged to construct cart-tracks along alignments previously approved by the Range Officer. Extraction of big logs from stump site to cart-track may be done either by coolies or by bullocks.

292. *Depot.*—In the event of departmental exploitation being undertaken a central depot will be maintained at Diguvametta where periodical auctions will be conducted.

SECTION 6.—REGENERATION OPERATIONS.

293. *Regeneration.*—No artificial regeneration will be undertaken in the Rakasipenta and Malakondapenta series as none is considered necessary. The series contain dense and sparse bamboo areas with scattered tree growth. The removal of exploitable trees will benefit the bamboo crop which will close up the openings created. In the Iskagundam and Obulesunipenta series a fair amount of natural regeneration and poles of valuable species exist. These will to a certain extent benefit by tending operations mentioned above. Beyond these no other measures of tending will be carried out during the period of the plan.

294. *Artificial regeneration.*—In the Iskagundam and Obulesunipenta series instead of undertaking diffuse regeneration work over the entire coupe in the gaps created by the felling of trees, concentrated artificial regeneration in small compact areas on good sites will be done so as to replace the stock removed under the selection fellings. The average annual yield from these two series will be 8,250 cubic feet and it is proposed to replace this stock by planting up annually 5 acres of suitable land. On the assumption, which appears to be a reasonable one, that one acre of teak plantation at an espacement of 6 feet by 6 feet will at the end of a rotation of about 60 or 70 years yield 150 trees, and each tree will yield about 12 cubic feet on an average, the annual yield, excluding intermediate thinnings, will be 1,800 cubic feet. Annually five acres will have to be planted up to replace the stock removed under selection fellings. The area may be increased if circumstances permit and results warrant an increase.

295. *Area.*—An area of 50 acres has been selected for plantation work in the Iskagundam series on the banks of the Gundlakamma in coupes V, VI and VII felled between the years 1935 and 1937. The area contains plenty of bamboo with occasional tree growth. The soil is deep, loamy and fairly well drained. Annually an area of five acres will be selected progressively from one end of the block of 50 acres for artificial regeneration and will be treated in the following manner.

296. *Clearfelling.*—The area will be clearfelled of all growth, any timber that may be marketable at a profit, will be converted and extracted. All trees will be felled as low as possible, and bushes and scrub growth will be cut down to ground level. No advance growth will be retained. Clearfelling must be completed by the end of November.

297. *Billeting and piling.*—The slash left, as well as other materials obtained from clearfelling will be billeted and piled in small heaps and compacted to a height of three feet. These heaps will be uniformly distributed over the entire area and will be allowed to dry for several weeks.

298. *Burning*.—The regeneration area will be fire-traced by cutting and burning a line 30 feet wide all round it before the end of January. As soon as the slash heaps are dry enough, they will be burnt under the supervision of a Forester. A second burning will, if necessary, be done after repiling the wood left unconsumed in the first burning. The burning must be completed before the middle of March.

299. *Lining and staking*.—An espacement of 6 feet by 6 feet will be adopted. The regeneration area will be lined and staked before the end of March.

300. *Soil preparation*.—The soil in the burnt patches will be well and evenly mixed up with the ash as soon as burning is completed to prevent its being blown or washed away. Experiments made by the Provincial Silviculturist indicate that planting stumps in crowbar holes without any special preparation of soil is nearly as successful as planting in prepared patches or pits and is less costly. However, some soil working before planting is considered necessary on the Nallamalais. The soil will be loosened to a depth of 6 inches for a distance of 2 feet round each stake.

301. *Planting*.—Silvicultural research at present indicates that the end of May or early June is the best time for planting teak in the locality. Unless further research suggests an alteration in the procedure, one-year old teak stumps will be planted over one half of the regeneration area during the last week of May or the first week of June. In the second week of June one or two-year old stumps of *Pterocarpus marsupium* will be planted over the other half. All planting will be done in crowbar holes in the middle of the soil-worked patches. The best portions of the area should be assigned to teak. Stumps should be between 0·4 and 0·8 of an inch in diameter.

302. *Nursery*.—The number of stumps that will be required to plant up 5 acres is 5 × 1,200 = 6,000. Adding 30 per cent casualties the number of stumps required annually will be 8,000. A nursery bed 40 feet by 4 feet sown under ideal conditions and in accordance with the latest methods of nursery practice, whereby the seeds are sown evenly and no pricking out is done, will produce 1,000 good stumps in the first year and about 600 in the second year. In this locality the expectation should be at least half. On this basis ten nursery beds 40 feet by 4 feet will be required every year; in order to have rotation of beds once in three years, 30 beds may be formed. An area large enough for a permanent nursery which will be located near Iskagundam on the bank of the Gundlakamma on or near the old nursery site. Reference is again made to this under paragraph 334. Half the number of beds will be sown with teak and the other half with *Pterocarpus marsupium*. Details as regards nursery practice are given in the Madras Forest Pocket Book and also in the administration reports of the Provincial Silviculturist. The objective should be to produce good stumps of teak and *Pterocarpus marsupium* between 0·4 and 0·8 of an inch in diameter at the end of one year after sowing. About 30 pounds of teak seed will be required to sow one nursery bed. Two extra beds of each species will be required in the first year, as there will be no two-year old stumps. These may be located in any place approved by the District Forest Officer.

303. *Kumri*.—The regeneration areas will be allowed to be kumried by the Chenchus of Iskagundem if they are willing to do it. Departmental kumri may be undertaken with a view to providing food grains for the Chenchus and for the elephants at Gundlabrahmeswaram.

SECTION 7.—SUBSIDIARY SILVICULTURAL REGULATIONS.

304. *General*.—Subsidiary silvicultural requirements of young plantations vary with the conditions of the locality and no hard and fast rules can be laid down. The following is only a rough forecast of what will be required and the District Forest Officer will have full discretion to modify it in the light of experience gained. Reference should also be made to the latest technique of plantation work published annually in the administration reports of the Provincial Silviculturist.

305. *Replacement of casualties*.—Casualties will be replaced in the first year between the months of July and October by stumps. Casualties among *Pterocarpus marsupium* should be replaced by teak. No further replacements will be done. Every endeavour should be made to obtain full stocking in the first year.

306. *Weeding*.—As a general rule weeding and soil working will be done as often as necessary and to the extent funds permit. Weeding will consist in the removal of all growth to a width of two feet on either side of the plant rows. Soil working will consist in loosening the soil round the plant to a distance of 2 feet all round it and to a depth of 4 to 6 inches. Three weedings and soil workings will probably be required in the first year. The final soil working will be done in January or February before the hot weather. Soil working should be done when the soil is dry after the rains and not when it is wet. Weeding and soil working will be done in the second year in respect of backward plants.

307. *Cleaning*.—A cleaning combined with creeper cutting may be necessary in the fifth year. In all weeding and cleaning operations care should be taken to retain all species that are likely to form a suitable mixture with teak.

308. *Thinning.*—Each plantation will be inspected by the District Forest Officer at the end of the fifth year with a view to deciding on the necessity for thinnings. Thinnings will be done when they become necessary. The advantages of early and heavy thinnings before crown restriction takes place are emphasized.

SECTION 8.—OTHER REGULATIONS.

309. *Fire protection.*—The regeneration areas will be fire protected for a period of ten years by clearing and burning a line 30 feet wide all round in the month of January.

310. *Grazing.*—The plantations will be closed to general grazing during the period of the plan.

311. *Demarcation.*—Plantation stones at important corners of the regeneration area will be erected showing the year of formation and area.

312. *Control.*—A Control Book, a Record of Works, a Regeneration Ledger, a Control Map and a Nursery Ledger will be maintained. The Control Map for the plantation will be on a scale of 16 inches = 1 mile wherein the areas planted with teak and *Pterocarpus marsupium* should be distinctively shown.

CHAPTER III.—WORKING PLAN FOR THE POLE WORKING CIRCLE.

SECTION 1.—GENERAL CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF THE VEGETATION.

313. *Constitution.*—This working circle embraces all reasonably good pole forests of superior deciduous species in localities situated within economic distance to make exploitation remunerative. The areas lie along the inner slopes of the Nallamalais from Sandrapodu on the south to Malakondapenta, Iskagundam and Chinnamantrala on the north The average annual rainfall is in the neighbourhood of 35 inches; the soil consists of brownish loam of moderate depth in the valleys and on flat ground, and mixed with boulders and shales on slopes. Steep slopes and dense bamboo areas have been, as far as practicable, excluded from the working circle.

314. *Crop.*—The forest crop consists of mixed deciduous species of poor height growth, low girth and inferior quality timber with dense tall grass as undergrowth. The density of stocking varies from 0·5 to 0·7 and the canopy is open. The prevailing utility species are *Terminalia tomentosa, Anogeissus latifolia, Pterocarpus marsupium*, teak, *Bassia latifolia, Chloroxylon swietenia, Cleistanthes collinus*, etc. Softwood species occur scattered. Trees seldom attain a height of 40 feet, the average being in the neighbourhood of 30 feet. The average girth of the crop is about 24 inches though individuals may attain up to 36 inches in girth. Over a major portion of the working circle regeneration of valuable species is scanty though in a few selected, favourable localities it is fairly profuse. In some places natural regeneration is struggling for freedom through the grass and overhead cover. Bamboos occur along stream banks. Unsoundness in trees is common due to annual destructive fires and possibly also to extreme climatic variations and lack of moisture in the soil. Dense tall grass of good fodder value is universal; *Phoenix* occurs scattered in some localities. In general, the factors of the locality appear unsuitable for the production of high grade timber as is evidenced by the fact that even comparatively small trees of 2 feet to 2½ feet in girth show signs of stagnation and drying up at the ends of the branches. At best, the locality is capable of producing poles of valuable species up to a girth of 24 or 30 inches.

315. *Object.*—The object of this working circle is to supply rural centres within the division with poles and small timber for constructional and agricultural purposes. Incidentally, in localities where fuel is likely to command a reasonable price, some firewood also may be exploited from unsound trees and from the top ends of felled trees. The local demand for constructional timber is estimated to be in the neighbourhood of 70,000 cubic feet per annum. The timber from this working circle is mostly utilized for constructional purposes by middle class men, the richer classes preferring large sized timber which is either obtained from the interior timber forests on the Iskagundam plateau or is imported from outside the district.

316. *Area.*—The area of the working circle is 13,936 acres.

317. *Felling series.*—The working circle is divided into five felling series as detailed below:—

Range.	Name of seri	Timber area in acres.	Bamboo area in acres.	Total area in acres.
(1)	(2)	(3)	(4)	(5)
Dornal	1 Mogilutla	2,475	275	2,750
Gundlakamma	2 Iskagundam ..	1,190	348	1,538
Do.	3 Malakondapenta ..	2,760	490	3,250
Giddalur	4 Sandrapodu ..	3,200	954	4,154
Do. .. .	5 Mamidigundam ..	1,944	300	2,244
	Total ..	11,569	2,367	13,936

The following statement compares the provisions under the previous working plans with proposals under this working plan with reasons for deviation—

Serial number and range.	Provisions under former plans. Series.	Area in acres.	System.	Rotation.	Provisions under the present plan. Series.	Area in acres.	System.	Rotation.	Remarks.
1 Dornal ..	Mogilutla ..	2,278	Original prescription consisted of a preliminary felling followed by a final felling in the sixth year. Afterwards it was changed to direct clearfelling.	40	Mogilutla ..	2,750	Clearfelling with retention of advance growth of valuable species up to 12 inches in girth. Bamboos will be left unfelled.	50	....
2 Turimella ..	Maddipenta ..	1,223	Do.	40	Abandoned ..	..	....	..	There is no demand for this series as the area contains dense bamboos. Better to work the area for bamboo only.
3 Gundlakamma ..	Malakondapenta.	8,646	Coppice with standards with a maximum of 30 standards per acre and retention of all advance growth up to 6 inches in girth.	60 for coppice and 120 for standards.	Malakondapenta.	3,250	Clearfelling with retention of advance growth of valuable species up to 12 inches in girth. Bamboos will be left unfelled.	50	On actual mapping it is found the area suitable for inclusion in the series is far less than what was shown in the old plans.
4 Do. ..	Vedurlakonda ..	7,276	Do.	Do.	Abandoned ..	..	....	..	All suitable and accessible areas on the plateau have been felled over and what is left is a small area on steep slopes and of poor growth. Stockmapping shows much less area than in the old plans. The series cannot therefore be continued.
5 Do. ..	Iskagundam ..	3,096	Clearfelling with the retention of advance growth of sound saplings and poles below 18 inches in girth for all species except *Hardwickia binata* and *Anogeissus latifolia* where 24 inches and 12 inches have been adopted.	60	Iskagundam ..	1,538	Clearfelling with retention of advance growth of valuable species up to 12 inches in girth. Bamboos will be left unfelled.	50	The exploitable area is considerably less than what was shown in the old plans.
6 Do. ..	Reserve Series ..	2,552	Do.	60	Abandoned ..	..	....	..	There has been no demand for this series during the period of the plan as it is remotely situated.
7 Giddalur ..	Sandrapodu ..	3,276	Do.	60	Sandrapodu ..	4,154	Clearfelling with retention of advance growth of valuable species up to 12 inches in girth. Bamboos will be left unfelled.	50	....
8 Do. ..	Mamidigundam	3,765	Do.	60	Mamidigundam.	2,244	Do.	50	Present area on stockmapping is found less.
9 Do. ..	Bodi	3,900	Do.	60	Abandoned ..	..	....	..	There is no demand for the series and it has not been operative after the first two coupes were sold.
	Total ..	36,012			Total ..	13,936			

The foregoing statement shows that the extent of the present working circle is only about one-third of the previous working circles. The reasons for this are :—

(*a*) Four of the old series had to be abandoned as there was either no demand at all or the demand was negligible.

(*b*) Present standards of stockmapping show the available area as much less than what has been marked in the old plans.

(*c*) In respect of the Vedurlakonda series which has been worked till recently, suitable areas for further fellings are not available. At present there are two series, Malakondapenta and Vedurlakonda, on the plateau contiguous with one another. Work in the latter series has been proceeding in a southerly direction and the last coupe has touched the edge of the plateau. Areas left unworked consist of steep slopes and contain poor growth and are therefore unsuitable for inclusion in the series.

SECTION 2.—ANALYSIS AND VALUATION OF THE CROP.

318. *Analysis.*—No detailed analysis or valuation of the crop was undertaken nor is one justifiable in view of the poor quality of the forest. A careful selection of the area has, however, been made with reference to the timber stand and extraction facilities. The limits of the series are shown on the detailed maps. Enumeration of linear sample plots laid out in or near the working circle at the time of the preparation of the working plan for Kurnool East by Mr. Anantanarayana Sarma showed an average stand of 130 cubic feet of timber per acre; past average from felled coupes has been 110 cubic feet.

319 and 320. *Deleted.*

SECTION 3.—METHOD OF TREATMENT.

321. *Proposed system.*—The silvicultural system under this plan will be coppice felling with retention of advance growth of valuable species up to a girth of 12 inches over bark at breast height. This system has been selected so as to foster and encourage existing advance growth which has escaped destruction from fires. The following species are considered valuable: teak, *Terminalia tomentosa*, *Pterocarpus marsupium*, *Dalbergia latifolia*, *Bassia latifolia*, *Lagerstroemia parviflora*. Coppice regrowth and existing natural regeneration will be depended upon to restore the tree canopy and planting will be done over small compact areas to replace the natural mortality among coppice stools.

322. *Rotation.*—A rotation of 50 years is prescribed. The following considerations have prevailed in the fixing of the rotation :—

(*a*) Local factors appear capable of producing trees of about 30 inches in girth only though individuals in a crop under favourable conditions may attain somewhat bigger dimensions.

(*b*) Unsoundness in trees sets in early even when they are about 30 inches in girth; a defect brought about not only by annual fires but also, it is believed, by extreme climatic variations and lack of moisture in the soil.

(*c*) The mean annual girth increment of coppice is about 0·6 of an inch up to an age of 14 years. Ring countings on teak stumps indicate that the mean annual girth increment of teak is in the neighbourhood of 0·8 of an inch.

(*d*) A ready and remunerative market for material of valuable species between 12 and 30 inches in girth exists.

The object of management is to produce trees of about 30 inches in girth and a rotation of 50 years is, therefore, considered suitable.

323. *Division into coupes.*—Ten coupes intended for felling during the period of the plan are shown on the detailed maps. Coupes felled in the past are also distinctively shown. Coupe lines run in a north-south or east-west direction. The coupes have been formed and arranged with an eye to extraction facilities. The numbering of the coupes has been done in a continuous serial from the last coupe felled in the series under the previous working plans. Coupes have been formed with, as far as possible, equal effective timber area in each, except in the case of the Mogilutla Series where a slight departure was found necessary.

324. *Yield.*—The annual yield will be regulated by area. On an average about 110 cubic feet of timber per acre may be expected from the annual coupes. The annual yield from this working circle is estimated to be 27,500 cubic feet of timber.

SECTION 4.—METHOD OF EXECUTING THE FELLINGS.

325. *Order of fellings.*—Annually one coupe in each series commencing from the number given in the following statement and in the serial order given will be taken up

for exploitation. The following statement shows the order in which the coupes are to be worked and their areas :—

Range.	Series.	Coupe No.	Area in acres.		
			Timber.	Bamboo.	Total.
Dornal ..	Mogilutla ..	XII	55	..	55
		XIII	50	2	52
		XIV	52	..	52
		XV	52	..	52
		XVI	42	14	56
		XVII	35	23	58
		XVIII	47	8	55
		XIX	47	8	55
		XX	31	24	55
		XXI	55	..	55
		Total ..	466	79	545
Gundla-kamma.	Iskagundam.	XI	23	4	27
		XII	23	6	29
		XIII	23	2	25
		XIV	23	3	26
		XV	23	..	23
		XVI	23	..	23
		XXII	23	11	34
		XVIII	23	5	28
		XIX	23	4	27
		XX	23	..	23
		Total ..	230	35	265
Do. ..	Malakonda-penta.	XIV	55	13	68
		XV	55	..	55
		XVI	55	..	55
		XVII	55	11	66
		XVIII	55	4	59
		XIX	55	..	55
Gundla-kamma—*cont.*	Malakonda-penta—*cont.*	XX	55	..	55
		XXI	50	6	56
		XXII	55	..	55
		XXIII	56	10	66
		Total ..	546	44	590
Giddalur ..	Sandrapodu.	XI	64	20	84
		XII	64	26	90
		XIII	64	6	70
		XIV	64	16	80
		XV	60	22	82
		XVI	69	6	75
		XVII	64	26	90
		XVIII	64	14	78
		XIX	64	..	64
		XX	64	12	76
		Total ..	641	148	789
Do. ..	Mamidi-gundam.	VIII	40	10	50
		IX	40	2	42
		X	40	7	47
		XI	40	5	45
		XII	40	23	63
		XIII	40	..	40
		XIV	40	..	40
		XV	40	..	40
		XVI	40	..	40
		XVII	40	..	40
		Total ..	400	47	447

326. *Unworked coupes.*—The plan indicates the sequence of the coupes to be felled annually without definitely allotting them to particular years. If, therefore, a coupe cannot be worked during a year, no deviation from the working plan is involved. The next coupe may be worked in the following year, if for valid reasons, which should be recorded in the Control Journal, the previous coupe could not be worked.

327. *Demarcation.*—The annual coupe will be demarcated on the ground with reference to the detailed maps by a cut line 6 feet wide all round it in the month of January preceding the year of felling. The coupe as laid out will be surveyed and the area computed. Each coupe will be divided into two or three strips, the strip lines running at right angles to the contours. The strips should be so arranged that the last strip adjoins the next unfelled coupe, so that any portion remaining unfelled in the coupe may be contiguous with an unworked coupe.

328. *Agency of exploitation.*—Exploitation by contract agency will be the normal practice. The sale will be held in the month of February. The total area of the coupe will be put up in auction. Departmental exploitation may be undertaken if circumstances warrant it. Forward contracts should be obtained if departmental exploitation is undertaken.

329. *Period of lease.*—The period of lease will be one year from the 1st of April but fellings must be completed by the end of December. Time for removal of the produce will be granted up to the end of March. The contractor should be warned that the timber will lie in the coupe at his sole risk.

330. *Unfelled areas.*—In the event of any portion of a sold coupe remaining unfelled at the close of the lease period, such portion will be surveyed and the area computed. At the time of the sale in the following year, every endeavour should be made to get the contractor of the current year's coupe to purchase the unfelled portion of the previous coupe also and to have it felled early in the lease period.

331. *Felling rules.*—The following felling rules are prescribed :—

(*a*) The annual coupe will be felled of all woody growth except those that are specified below in (*c*), (*d*) and (*e*) at a height not exceeding one foot from the ground level.

(*b*) The cut should be clean and slanting and the bark should not be separated from the stump. Subsequent trimming of the stumps should not be done.

(*c*) Advance growth, i.e., seedlings and saplings of valuable species of and below twelve inches in girth at breast height will be left unfelled.

(*d*) Bamboos occurring within the annual coupe will be left unfelled and will be worked when the bamboo coupe in which it is included is due for felling. The inclusion of a certain amount of bamboo areas within the annual coupe has been unavoidable and the statement of coupes shows the bamboo and effective timber areas separately. Any tree growth occurring within the bamboo area may be felled and removed by the contractor, but

(e) tamarind trees, if any, occurring within any part of the annual coupe will be left unfelled.

(f) Felling will progress strip by strip commencing from the first strip. Work in the next strip will not be allowed unless the work in the previous strip has been inspected and passed as satisfactory by the Range Officer.

(g) The contractor will be bound to clearfell all woody growth including bamboos in the area chosen for planting and heap the felled material as detailed in the following paragraph.

SECTION 5.—SILVICULTURAL REGULATIONS.

332. *Regeneration.*—Regeneration operations will consist of two parts :—

(a) Artificial regeneration.

(b) Tending natural regeneration.

333. *Artificial regeneration.*—The natural mortality among stumps of trees felled is estimated to be seven per cent. Instead of undertaking diffuse ' rab ' regeneration work over the entire coupe, small compact plantations of teak and *Pterocarpus marsupium* will be raised on the most suitable portions of the area prescribed for felling during the period of this plan. Towards this end the areas suitable for planting have been chosen and are indicated on the detailed maps. The following statement shows the total area selected for planting and the area that should be planted up annually in each series :—

Series.	Area selected for planting in acres.	Area to be planted up annually in acres.	Series.	Area selected for planting in acres.	Area to be planted up annually in acres.
1 Mogilutla	41	not less than 3	4 Sandrapodu	69	not less than 4
2 Iskagundam	56	,, 2	5 Mamidigundam	48	,, 3
3 Malakondapenta	72	,, 3			

The area to be planted up annually in each range will be

Dornal	3 acres (in minimum).	Giddalur	7 acres (in minimum).
Gundlakamma	5 ,, ,,		

Instead of planting up small areas in each series, it is proposed to concentrate planting work in each range.

The area to be planted up annually will be selected and laid out at the same time as the annual coupe is surveyed and demarcated before the sale. The regeneration area will be leased to the contractor who has purchased the annual coupe. The contractor will be required to fell all woody growth including bamboo within the regeneration area before the month of December of the year of lease. He will be allowed to remove timber of and above 24 inches in girth, over bark at breast height. The rest of the felled material including bamboos will be stacked by the contractor in heaps 30 feet by 30 feet and to a height of 3 feet after compacting. The heaps will be evenly distributed over the entire regeneration area. No debris heaping of any sort will be required to be done by the contractor in any other part of the annual coupe. The debris heaps will be burnt in the month of March, care being taken to see that the fire does not escape into the adjoining forest. As soon as possible after the burn, the resultant ash will be spread over as large an area as can be managed and lightly worked into the soil. A second burning may be necessary if the first one was not successful. In April, the entire regeneration area will be aligned and staked at an espacement of 6 feet by 6 feet. The soil will be loosened to a depth of 6 inches for a distance of 2 feet round each stake. Silvicultural research at present indicates that the end of May or early June is the best time for planting teak in the locality. Unless further research suggests an alteration in the procedure, one-year old teak stumps will be planted over one-half of the regeneration area during the last week of May or first week of June. In the second week of June one or two-year old stumps of *Pterocarpus marsupium* will be planted over the other half. All planting will be in crowbar holes in the middle of the soil-worked patches. The best portions of the area should be assigned to teak. Stumps should be between 0·4 and 0·8 an inch in diameter. Casualties will be replaced by stumps between the months of July and September following planting ; thereafter, no further replacement of casualties will be done. Weeding and soil working will be done as often as they are found necessary. Normally three weedings and soil working will be required in the first year. In the second year weeding and soil working will be done in respect of backward plants, i.e., plants below 3 feet in height. At the time of weedings spontaneous growth of valuable species will be retained to form a suitable mixture with the planted species. Thinnings may become necessary in the fifth year when the District Forest Officer will examine each plantation and decide as to when it should be done. The necessity to thin early and at frequent intervals is emphasized.

334. *Nursery.*—A central nursery will be maintained at Iskagundam adjoining the nursery prescribed under the Timber Working Circle for producing the requisite number of stumps. The nursery beds will be of the standard dimensions 40 feet by 4 feet. One bed will normally produce about 1,000 healthy teak stumps of the requisite size at the end of the first year and about 600 at the end of the second year. In this locality, the expectation should be at least half. The total number of stumps required to plant up 15 acres at an espacement of 6 feet by 6 feet including replacement of 30 per cent casualties in the first year will be 24,000. Thirty nursery beds will, therefore, be required but in order to have alternation of beds once in three years, 90 beds will be required. Provision has been made under the Timber Working Circle for 30 nursery beds. Altogether 120 nursery beds will

be required at Iskagundam for the two working circles. The nursery will be located on the bank of the Gundlakamma river on good, well-drained, deep soil preferably the site of the old nursery. One set of nursery beds will be used continuously for a period of two years so as to make use of the suitable two-year old stumps and, thereafter, will be left fallow for a year. The raising of a leguminous crop such as Boga, horsegram, etc., on the beds left fallow and have the crop dug in as a measure of enriching the soil is recommended. Details are left to the District Forest Officer who will consult the Provincial Silviculturist on the subject. Half the number of beds will be sown with teak and the other half with *Pterocarpus marsupium*. Teak seed should be sown evenly on the nursery bed and lightly covered with earth and watered till germination takes place. About 30 lb. of teak seed will be required to sow one bed. The seedlings should not be pricked out. Weeding and soil working the beds will be done as often as necessary. The objective should be to produce good healthy stumps between 4 and 8 of an inch in diameter.

335. *Natural regeneration.*—In the first year, existing natural regeneration coppice regrowth and advance growth of valuable species in the coupe will be tended by freeing them from climbers, removing suppression from inferior growth, weeding round unestablished regeneration and cutting back obviously unsound and malformed stems. The operation will be repeated in the second year. In the fifth year, the entire coupe will be given a general tending consisting in thinning out congested areas, freeing valuable species from climbers and inferior growths, reducing the number of coppice shoots in a stool to the most vigorously growing one. The tending operations prescribed herein will be carried out in the coupes felled recently under the previous working plans.

336. *Cost of regeneration operations.*—The regeneration and tending operations detailed above may appear formidable and expensive but emphasis is laid on the necessity to spend money on them commensurate with the revenue obtained from the exploitation of the annual coupes, not only to replace the natural mortality among coppice stools but also to improve the stocking which at present is deficient. In the past not even 5 per cent of the total revenue obtained from this working circle was spent on regeneration works with the result the work undertaken has not yielded satisfactory results in many places. Money should be spent more liberally in future on regeneration operations if the forests are to be maintained in a state of reasonably good productivity. The plantation work envisaged above would entail artificial regeneration of about one-fifteenth of the total area of the coupe. On a conservative estimate an amount of Rs. 30 will be required to raise and maintain an acre of teak plantation. If this expenditure is distributed over the entire coupe exploited, the cost of regeneration will be Rs. 2 per acre. The tending operations prescribed above will cost about Re. 1–8–0 per acre or in all an amount of Rs. 3–8–0 per acre of the coupe exploited will have to be expended on regeneration and tending operations.

SECTION 6.—OTHER REGULATIONS.

337. *Grazing.*—Felled coupes will be closed to grazing for a period of four years from the year of felling. The plantations will be closed to grazing for a period of ten years from the year of formation. Grass cutting by the villagers will not be allowed in the felled coupes during the period of closure to grazing owing to risk of damage by grass cutters and the bulls to seedling growth.

338. *Fire protection.*—Felled coupes will be fire-protected for a period of four years from the year of felling by cutting two guide lines six feet wide each and burning an intermediate belt of 18 feet about the middle of January all along the periphery of the coupe. Where coupes are contiguous with one another, fire tracing of the entire periphery of the block would suffice. Plantations will be fire-protected for a period of ten years from the year of formation by scraping a line six feet wide all along the periphery in the month of January every year.

339. *Coupe stones.*—Stones showing the working circle, the felling series, coupe number, area and the year of working will be planted at the corners of each coupe worked. Stones showing the year of plantation will be planted at the corners of the plantations.

340. *Control.*—A Control Book, a Record of Works, a Regeneration Ledger, a Nursery Ledger and Control maps will be maintained. The control maps will show the limits of the coupe exploited as well as the location of the area planted up.

CHAPTER IV.—WORKING PLAN FOR THE SMALL TIMBER WORKING CIRCLE.

SECTION 1.—GENERAL CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF THE VEGETATION.

341. *Object.*—The object of this working circle is to supply the small timber requirements of the villages in the vicinity of forest areas for *bona fide* domestic and agricultural purposes. Next to pasture, the main demand of the local population is for timber for agricultural implements and for construction of small houses. Strictly speaking, unreserves adjoining each village should form the legitimate source of supplying the needs of the villagers in this respect but, on account of unrestrained fellings in them in the past, the villagers are compelled to resort to the reserves for satisfying, at any rate, a part of their present requirements, and at no distant date they will have to look forward solely to the reserves for meeting their entire requirements. Timber theft from the reserves has been, and is, going on by the plainsmen below and the Chenchus on the

hills with the result, the forest between the Chenchu gudems and the plains have deteriorated to such an extent that remoter areas in the interior have to be called on to contribute to the supply of small timber in the future. The demand for small timber is large, the nearer forests do not contain the necessary material to meet the demand, the people persist in resorting to illegal practices for the satisfaction of their demands rather than pay a legitimate fee to the Forest Department for obtaining their requirements, and the staff is inadequate and helpless and is often tempted to connive with the villagers by helping them to obtain their needs illicitly. An obligation rests on the management to provide a legitimate means of satisfying this demand and towards this end this working circle has been constituted. Considerations of revenue have, therefore, been subordinated to satisfying the legitimate demands of the people consistent with the conservancy of the forests.

342. *Constitution.*—All reasonably accessible areas containing appreciable growth of species utilizable as small timber and situated within economic distance of exploitation are included in this working circle.

343. *Area.*—The area of the working circle is 44,086 acres.

344. *Felling series.*—The working circle is divided into seven felling series. The felling series are constituted with reference to the area available for exploitation, extraction facilities and proximity to Chenchu gudems or villages.

345. The following statement shows the position of the series as it existed under former plans and as proposed now.

Under former plans.			Under the new plan.			Remarks.
Series.	Area in acres.	Felling cycle.	Series.	Area in acres.	Felling cycle.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Dornal Range.			
Peddachama ..	634	10 years ..	1 Peddachama.	4,262	10 years ..	Larger areas were found suitable on stockmapping and have been included in the series.
Chintala ..	2,542	Do.	2. Chintala ..	4,908	Do.	
			3. Nallagunta.	3,747	Do.	A newly constituted series.
			Giddalur Range.			
Mallalamma ..	7,660	Rotation 30 years on a system of selection coppice.	....	..	....	These six series were constituted as Agricultural Implement Series under the Giddalur-Gundlakamma Working Plan but in actual practice they were largely worked for fuel and contain little of agricultural timber. Five series have been reconstituted into fuel series under the present plan.
Barlakunta ..	4,156					
Veerareddikunta ..	4,264					
Chintalapalli ..	4,663					
Yerraguntla ..	4,906					
Tadutla	3,179					
Uyyalavada ..	2,850	30 years rotation coppice with standards.	4. Uyyalavada.	6,710	Do.	Larger areas have now been included.
			Ganjivaripalli Range.			
Telugurayanicheruvu.	12,928	10 years ..	5. Telugurayanicheruvu.	8,391	10 years ..	....
Guttalachenu ..	19,904	Do. ..	6. Guttalachenu.	11,146	Do.	....
Regumanipenta ..	4,288	Do. ..	....	..	....	Abandoned as the series has been inoperative and the growth is poor and the slopes are steep.
			Turimella Range.			
Papinenipalli ..	2,251	10 years ..	7. Papinenipalli.	4,922	10 years ..	....
			Total	44,086		

The Regumanipenta series which was prescribed under Mr. A. N. Sarma's Working Plan has been abandoned, as it contains scanty growth of utilizable species, the trees are mostly unsound and the locality is steep ; wherefore the retention of forest cover is more important for the indirect benefits it confers. Out of the six series constituted under Mr. A. V. Sundaram's Working Plan under the Agricultural Implements Working Circle five have been reconstituted and included under the Fuel Working Circle as the series are mainly worked for fuel and to a very small extent for agricultural timbers, and one has been abandoned. A new series called the Nallagunta series has been constituted between Chinnamantrala and Eguvacherlopalle to meet the demands of the villages close by. The series have been formed with natural features as boundaries, wherever possible. The limits of the old series have been suitably changed for valid reasons.

346. The following statement gives details of the series with a description of their boundaries :—

Serial number and series.	Total area in acres.	Effective *Hardwickia* area in acres.	Boundary description.
(1)	(2)	(3)	(4)
			Dornal Range.
1 Peddachama ..	4,262	608	*North.*—Starting from ·2420 which is about half a mile north of the junction of the Kudupa-Peddachama footpath and the Rollapenta-Peddachama road ; along the ridge ·2480, ·2420, ·2400, ·2410, △ ·2339, ·2120, to meet Thummalabailu-Peddachama bridle-path. *East.*—The said bridle-path up to the Chamathukalva ; the said kalva to meet the Samakalva ; thence a cart-track to meet the Peddachama-Rollapenta road ; the road, the Peddachama-Cherlopalli footpath, the Chintala-Cherlopalli bridle-path to the ridge. *South.*—Along the ridge △ 2372, ·2460, ·2420, ·2400, ·2510, ·2480 to △ 2507.
2 Chintala ..	4,908	1,983	*North.*—Starting on the Chamathukalva to the west of ·2120, along the ridge △ 2388, ·2280, △ 2227, ·2190, △ 2349, Chamakonda, ·1950, △ 2143, ·1860, ·1450 to meet the footpath from Telugurayanicheruvu to Chintala.

Serial number and series. (1)	Total area in acres. (2)	Effective *Hardwickia* area in acres. (3)	Boundary description. (4)
			Dornal Range—cont.
			East.—Thence along a cart-track to meet the Peddachama-Dornal road near △ 1186 Peddamma ; the said road to meet the Peiyalapaya ; along the Peiyalapaya to a streamlet from Podilavulannupenta ; thence up the streamlet to the Cherlopalli fire line. *South.*—Along the said fire line to the Peddachama-Cherlopalli footpath. *West.*—The Cherlopalli-Peddachama footpath and a cart-track to meet Chamathukalva ; up the said kalva to the starting point.
3 Nallagunta ..	3,747	800	*North.*—Starting from the junction of the Narlapaya-Nagayyakunta fire line with the Nallagunta-Chinnamantrala road ; along the said road to the Cumbum reserve line ; along the reserve line to the Nallagunta-Kurapenta footpath. *East.*—The said footpath to the Sim's line. *South.*—Thence along the Sim's line to a streamlet about one furlong south of ·1100 ; along the streamlet and the ridge △ 1863, ·1870, ·1844, ·2250 ; thence an arbitrary line north-west to the Narlapaya-Nagayyakunta fire line. *West.*—Along the said fire line up to Narlapayakonda △ 2241 ; thence down the streamlet, then up another stream to the north of ·1360 ; thence an arbitrary line northwards to meet the Chinnamantrala-Nallagunta road at the 5th mile 6th furlong ; thence the said road to the starting point.
			Giddalur Range.
4 Uyyalavada ..	6,710	5,810	*North.*—Starting from △ 1656 down the spur eastwards, up the opposite spur and the saddle north of ·1430 Biduthanarava Tippa to a streamlet to the reserved forest boundary. *East.*—The reserved forest boundary to meet the Cuddapah district boundary. *South.*—The Cuddapah district boundary to its junction with the fire line to the east of ·1650. *West.*—The said fire line to meet the Sim's line ; the Sim's line to the Bodi vagu, up the vagu and a streamlet and the ridge through ·1480, ·1620, ·1660 to the starting point.
			Ganjivaripalli Range.
5 Teluguraya-nicheruvu.	8,391	2,477	*North.*—Starting from ·2520 on the Chintala-Peddarutla pilgrim path about six furlongs to the north-west of Jangamiddala penta, along the ridge ·2720, ·2690, ·2730, ·2600, ·2580 ; down a streamlet from ·2580, the stream which flows into the Telugurayanicheruvu ; the footpath to meet the Nekkanti-Telugurayanicheruvu bridle path ; the said bridle path till it meets the Ganjivaripalli-Telugurayanicheruvu road near the rest-house ; the said road to Budotipenta ; the Devaludu bridle path ; the Ralla vagu till it meets a streamlet from ·2120. *East.*—Up the said streamlet to ·2120 ; thence the ridge to △ 2471. *South.*—The ridge △ 2471, ·2190, ·2410, △ 2399, ·2290, ·2260 △ 2446 Gundlakuruva, till it meets the Range boundary at ·2210; the said boundary to the Chintala-Peddarutla pilgrim path. *West.*—The said pilgrim path to the starting point.
6 Guttalachenu ..	11,146	2,795	*North.*—The Kuntalapadugupenta-Palutla footpath up to ·1539 ; then a straight line to the Methotabhavi stream ; up the said stream to Methotabhavi ; then a straight line in an easterly direction through ·1600 b, ·1670, ·1650 b ; then through ·1650 to the Ankammakunta stream ; the Ankamakunta stream to the Alatum-Guttalachenu footpath. *East.*—The said footpath to Guttalachenu. *South.*—The Guttalachenu-Palutla footpath till it meets the Bandaleru ; up the Bandaleru to its junction with a streamlet from ·2130 near ·1480 : up the said streamlet to the south-west of ·2130, ridge ·2190, ·2203, △ 2115 Andugala bodu to the Nekkanti-Kuntalapadugu footpath. *West.*—The said footpath to the starting point.
			Turimella Range.
7 Papinenipalli series bit I.	4,922	2,616	*North.*—From the junction of the Obulesunipenta-Maddipenta bridle path and the Papinenipalli-Maddipenta road, along the said road to meet a cart-track about ten chains to the west of ·1138. *East.*—The said cart-track to meet the Sim's line ; the Sim's line to meet a cart-track near ·1130. *South.*—The said cart-track to meet a hill top on the ridge about 20 chains to the south of ·1570. *West.*—Thence a line running along the ridge passing through points ·1570, ·1670, ·1440, △ 1792, and ·1470 to meet Obulesunipenta-Maddipenta bridle path ; the said bridle path to the starting point.
Bit II	.. ..	..	*North.*—Starting from a streamlet about one furlong north of ·1620 ; up a tributary to the saddle between ·1620 and another hillock ; thence down a stream to meet another stream from △ 2240 ; up the latter stream to △ 2240 ; the ridge to ·1930 ; thence down the spur to the junction of the Sim's line and a cart-track ; the Sim's line to meet Bollupalli-Velagalapaya cart-track ; and thence an arbitrary line to the stream in between ·1810 and ·1720. *East.*—Along the said stream to the junction of two streams about two furlongs north of ·1090 ; thence an arbitrary line to meet a small stream about three chains to the west of ·1330 ; another arbitrary line due south to meet a point on the Velagalapaya-Bollupalli cart-track between ·1090 and ·1010. *South.*—Thence another arbitrary line running south-west to meet the junction of Velagalapaya stream and the footpath from Bollupalli ; down the said stream to meet the reserve boundary line ; the said boundary line to meet the Papinenipalli-Maddipenta road ; the said road to the Yerravagu ; up the said vagu to meet the Jampal Eru. *West.*—Up the Jampal Eru and its tributary to the starting point.

347. *Character of the vegetation.*—The areas included in this working circle consist largely of scattered *Hardwickia binata* and inferior deciduous types described in Chapter II of Part I. *Hardwickia binata* forms the principal species in the former type while, in the latter, it occurs diffusely; trees attain a height of 30 feet and a girth of 4 feet; mature and over-mature trees are found scattered, middle girth classes are moderately represented, lower girth classes and natural regeneration are not altogether satisfactory. Unsoundness is common in trees above a girth of 42 inches. The associates of *Hardwickia binata* are *Chloroxylon swietenia, Anogeissus latifolia, Albizzia amara, Acacia leucophloea, Boswellia glabra, Cleistanthus collinus*, etc., of which the first four are utilizable for agricultural implements. These species seldom attain a girth of 24 inches. Unsoundness sets in early, probably due to repeated fierce fires and inhospitable local factors. Tree canopy is open. The undergrowth consists invariably of grass of good fodder value which is grazed over by cattle.

SECTION 2.—METHOD OF TREATMENT.

348. *Species used.*—The following are the species utilized for agricultural timbers and small house construction.

English name. (1)	Local name. (2)	Dimensions. (3)	Most commonly used species. (4)
		Agricultural Implements.	
1 Plough share ..	Nagelu	4 feet × 21 inches	Billudu, Yepi, Thumma, Jhikreni.
2 Plough shaft ..	Nageti Nogalu ..	11 feet × 13 inches ..	Yepi.
3 Yoke	Kadimanu ..	8 feet × 12 inches	Chikreni.
4 Clod breaker ..	Dindu	4 feet × 17 inches	Yepi.
5 Weeder	Dant Dindu ..	4 feet × 17 inches	Yepi, Billudu, Thumma.
		Building materials.	
6 Door frames ..	Darabandam ..	7½ feet × 6 inches × 4 inches.	Yepi.
....	Addalu	5 feet × 6 inches × 4 inches.	Yepi.
7 Rafters	Dantalu	7½ feet × 14 inches to 9 feet × 24 inches.	Chiruman teak.
8 Pillars	Sthambalu ..	12 feet × 24 to 30 inches ..	Yepi.

Note.—Billudu .. .. *Chloroxylon swietenia.*
Yepi .. .. *Hardwickia binata.*
Thumma .. .. *Acacia leucophloea.*
Chikreni .. .. *Albizzia amara.*
Chiruman .. .. *Anogeissus latifolia.*

349. *System.*—The silvicultural system will be on a selection basis depending for regeneration on coppice regrowth and natural seedling regeneration supplemented by concentrated artificial regeneration over selected small areas.

350. *Choice of species.*—The following species will probably be exploitable; *Hardwickia binata, Anogeissus latifolia, Chloroxylon swietenia, Albizzia amara* and *Acacia leucophloea.*

351. *Exploitable size.*—The exploitable size will be 42 inches and above in girth over bark at breast height for *Hardwickia binata* and 18 inches and above in girth at breast height for the other species. The exploitable girths have been fixed with reference to the size required to meet the demands of the local population and also with reference to the soundness of the trees. *Hardwickia binata* under local conditions does not appear to keep sound above a girth of 42 inches while the other species do not keep sound above a girth of 24 inches at breast height.

352. *Felling cycle.*—A felling cycle of 10 years is adopted. An examination of the areas felled under Mr. Anantanarayana Sarma's Working Plan reveals the fact that there is still fairly enough exploitable material left in the coupes. This is partly due to under-exploitation in the past and partly to trees, which were below the exploitable size at the time, having become exploitable now. Silviculturally, it would be desirable to go over the area as speedily as possible so as to exploit the mature and unsound trees but administrative convenience indicates a cycle of ten years.

353. *Division into coupes.*—Each series has accordingly been divided into ten coupes. Well defined natural features have been chosen for coupe and series boundary and where artificial lines are adopted it is not intended that they should be laid out.

354. *Yield.*—No enumeration was undertaken and no forecast of yield can be given. A rough guess based on ocular estimate shows that on an average one exploitable tree of *Hardwickia binata* may be found in every five acres of the area chosen and two exploitable trees of the other species per acre.

SECTION 3.—METHOD OF EXECUTING THE FELLINGS.

355. *Coupe.*—Annually one coupe in each series will be taken up for exploitation in the order mentioned in the statement of fellings given below. Coupe boundaries need not be cut on the ground as they generally follow natural features.

Statement of fellings.

Coupe number.	Dornal range.						Ganjivaripalli range.	
	Peddachama series.		Chintala series.		Nallagunta series.		Teluguraayanicheruvu series.	
	Total area in acres.	Effective area in acres.	Total area in acres.	Effective area in acres.	Total area in acres.	Effective area in acres.	Total area in acres.	Effective area in acres.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
II	399	261	672	70	357	21	788	150
III .. .	449	50	610	79	230	..	1,078	137
IV	389	33	575	44	406	154	744	220
V	653	2	286	25	261	80	707	195
VI	505	..	421	117	301	112	1,256	432
VII	380	..	411	345	570	..	614	328
VIII	235	..	382	328	648	64	903	304
IX	304	2	356	56	423	224	730	274
X	558	141	845	661	241	81	1 004	292
I	390	119	350	258	310	64	567	145
Total ..	4,262	608	4,908	1,983	3,747	800	8,391	2,477

Coupe number.	Ganjivaripalli range—*cont.*		Coupe number.	Giddalur range.		Turimella range.	
	Guttalachenu series.			Uyyalavada series.		Papinenipalli series.	
	Total area in acres.	Effective area in acres.		Total area in acres.	Effective area in acres.	Total area in acres.	Effective area in acres.
	(10)	(11)		(12)	(13)	(14)	(15)
II	1,052	575	I	830	469	585	296
III	733	258	II	686	647	799	320
IV	1,138	375	III	664	664	471	264
V	764	150	IV	606	576	379	261
VI	1,331	303	V	680	617	495	328
VII	1,071	240	VI	725	725	420	242
VIII	1,565	268	VII	730	644	616	270
IX	1,654	216	VIII	579	579	388	293
X	885	195	IX	560	580	344	165
I	863	215	X	650	509	425	177
Total ..	11,146	2,795	Total ..	6,710	6,010	4,922	2,616

The working plan indicates the sequence in which the coupes are to be worked without definitely allotting them to particular years. If in any year a coupe cannot be exploited it will not constitute a deviation from the working plan. In the following year the coupe left unexploited in the previous year will be worked; if, however, there are valid reasons for not working this coupe, which should be recorded in the Control Journal, the next coupe may be taken up for exploitation. In the case of partially exploited coupes, the areas remaining unexploited during the previous year may be worked along with the coupe due for exploitation in the current year.

356. *Marking for felling.*—All *Hardwickia binata* trees of and above 42 inches in girth at breast height, as well as all trees of *Chloroxylon swietenia*, *Anogeissus latifolia*, *Acacia leucophloea* and *Albizzia amara*, of and above 18 inches in girth at breast height will be marked for felling provided the trees are reasonably sound and are likely to yield small timber for agricultural purposes or for house construction. Towards this end the co-operation of the villagers, especially of the village carpenter, should be enlisted at the time of marking to assist the marking officer in arriving at a decision as to whether a tree is suitable for the purpose or not. Unsound and defective trees may be marked for felling provided they can be converted into charcoal and sold at a profit. Marking should be done by a subordinate not below the rank of a Forester and 10 per cent of the markings should be checked and certified to as satisfactory by the Range Officer. All trees marked for felling will be numbered serially after blazing the trees both at breast height and at the base of the tree, and the girth at breast height, the species and the outturn of materials expected from each tree will be recorded in the appropriate columns of the timber register at the time of marking. The actual outturn obtained will be recorded after felling and conversion. Marking should be completed before the end of January.

357. *Agency of felling.*—Exploitation may be done either by contractors or departmentally. The main object is to supply the requisite agricultural timbers and building materials to the people and also provide work for the Chenchus, in localities where they

exist. Chenchu labour should invariably be employed on felling and conversion where they are available. If departmental exploitation is undertaken, the quantity exploited should be limited to local demand and, as far as possible, forward contracts or leases should be entered into before commencement of fellings. If the coupes are sold on contract, a stipulation should be made in the agreement that the coupe contractor should sell to *bona fide* ryots agricultural timbers at scheduled rates fixed by the District Forest Officer.

SECTION 4.—SUBSIDIARY SILVICULTURAL REGULATIONS.

358. *Regeneration measures.*—Natural regeneration is inadequate and it is obligatory to resort to artificial restocking. Instead of dissipating the energies of the staff in attempting to regenerate all the blanks created by the felling of trees, concentrated regeneration in small selected areas in combination with agriculture will be undertaken, as it is believed, that such a measure would ensure greater success at comparatively less cost and facilitate supervision and control. Besides, opportunities will be directly made available to the Chenchus to learn cultivation as all these regeneration areas, except in the case of the Uyyalavada series, will be in the vicinity of Chenchu gudems. A reason adduced in the past for non-advancement of Chenchu cultivation has been that the Chenchu is compelled to invoke the help of the local ryot for learning cultivation. A general apprehension is that if lands are merely granted to the Chenchus, it is not unlikely that they would eventually pass into the hands of the plainsmen. The policy of the department is to discourage the Chenchu from coming in direct contact with the plainsmen. Works done by the Chenchus either for the department or for the contractor are always paid for in kind, and payment of cash is discouraged and the department bears charges on transport of provisions from the nearest village market to the Chenchu gudem. Departmental 'kumri' will provide food grains *in situ* at cheap cost. Plenty of manure which at present is going to waste in the gudem may be utilized with advantage if cultivation is undertaken. In the circumstances, the raising of forest crops in combination with departmental cultivation would appear to be a satisfactory solution for the peculiar conditions prevailing locally. In the case of the Uyyalavada series, however, where no Chenchus exist, the regeneration areas will be 'kumried' either departmentally or by the villagers. The following is a brief indication of what will be required to be done in the matter of 'kumri'. Full discretion will be given to the District Forest Officer to make suitable modifications in the light of experience gained in actual practice.

359. *Area.*—In each of the small timber series and as conveniently close to the Chenchu gudem as possible, an area of about 50 acres of reasonably good arable land has been selected after careful examination for purposes of concentrated artificial regeneration. These blocks are indicated on the detailed maps.

360. *Demarcation.*—In January of each year an area of about 5 acres in each of the blocks will be selected progressively from one end of it and will be demarcated on the ground by a line 6 feet wide.

361. *Felling.*—The area will be clearfelled, any timber that may be marketable at a profit will be exploited. Considerations of revenue from timber, if any, should, if necessary, be subordinated to obtaining enough material for a satisfactory burn. Felling should be completed by the end of January.

362. *Piling and burning.*—Lines will be laid out at a distance of 30 feet apart. The felled material will be piled up on the lines to a width of 10 feet and a height of 3 feet after compacting. If enough material for burning is not available for all the lines, intermediate ones will be missed out. Burning of the heaped up material will be done in the month of March.

363. *Soil working.*—The entire area will be ploughed soon after a preliminary shower of rain is received. Subsequent ploughings will be done, as and when necessary, in conformity with local agricultural practice. The area will be manured to the extent funds permit.

364. *Sowing.*—Early in June, seeds of *Hardwickia binata*, *Pterocarpus marsupium*, *Sapindus emarginatus*, *Azadirachta indica*, *Acacia leucophloea* and *Chloroxylon swietenia* will be sown thickly along the middle of the burnt strips, separate lines being allotted to each species. A few one year old *Pterocarpus marsupium* stumps will be tried in crow-bar holes at intervals of 6 feet early in June. Care should be taken to see that the sown lines are not disturbed at the time of subsequent ploughings.

365. *Field crop.*—In July or August after some showers are received a field crop of ragi, korra, or jonna according to the suitability of the species to the locality will be sown broadcast in the strips between the sown lines. The sowing of field crops should not be done too close to the lines of tree crops.

366. *Tending.*—Weeding and soil working will be done for both the field and the tree crop as necessity arises. The regeneration area will be fenced with thorns and brushwood and a Chenchu watchman will be employed for watching the crop. The field crop will be harvested when mature and the grains will be stored for distribution to the Chenchus in payment for work done by them. A final ploughing will be done in January or so after the field crop is harvested.

367. *Second year cultivation.*—Cultivation in the second and third years may be undertaken if conditions admit of it.

368. *General.*—All the operations will be carried out by Chenchu labour only except in the case of the Uyyalavada series wherein plains labour will be necessary. In the latter case if the villagers undertake to 'kumri' they will be made responsible for the weeding, soil working and care of the plants free of cost. If departmental 'kumri' is done, the villagers will be paid their usual wages. The Chenchus own bulls bought out of Government advances, and it should be possible to hire them for 'kumri' work on reasonable terms.

369. *Casualties.*—Replacement of casualties will be done in the year of formation only by sowing at intervals of two weeks till September. Every endeavour should be made to obtain full stocking and maximum height growth in the first year itself. Subsequent tending of the forest crop will be left entirely to the discretion of the District Forest Officer.

370. *Staff.*—Emphasis is laid on the necessity to have an energetic and intelligent forester with capacity for organization in charge of each of the gudems wherein 'kumri' is prescribed.

371. Deleted.

SECTION 5.—OTHER REGULATIONS.

372. *Protection.*—The 'kumried' areas will be closed to grazing for a period of ten years from the year of formation and will be fire protected by scraping a line 6 feet wide all round. The annual coupes will not be closed to grazing.

373. *Control.*—The maintenance of the following control records is prescribed :—

(1) A Control Book ;
(2) A Record of Works ;
(3) A Regeneration Ledger ; and
(4) Control maps.

CHAPTER V.—WORKING PLAN FOR THE SOFTWOOD WORKING CIRCLE.

SECTION 1.—GENERAL CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF THE VEGETATION.

374. *General.*—The slate industry at Markapur consumes annually about 60,000 cubic feet of timber of softwood species for the purpose of framing slates and making packing cases. Of this total quantity about 38,000 cubic feet are obtained from Kallai (Malabar) in the form of ready-made slate frames out of species like *Tetrameles nudiflora*, *Alstonia scholaris*, etc., about 14,000 cubic feet from the Nizam's Dominions in the form of ready-made frames sawn out of *Givotia rottleriformis* and about 8,000 cubic feet are supplied from local resources. Chelama range now in the Kurnool West division supplies about 6,000 cubic feet annually, the Kurnool East division about 1,000 cubic feet and the balance 1,000 cubic feet are supplied from private sources. The demand for local wood has been negligible in recent years due to competitive supplies at low rates from foreign sources. The slump in recent years is partly attributable to the fact that local contractors are afraid of buying the local wood for fear of unhealthy and ruinous competition from Kallai and Hyderabad which may result in a severe loss to the local merchant. If local wood has to compete with foreign supplies three essentials have to be fulfilled.

(*a*) The Forest Department should be able to supply the wood at a cheaper rate than foreign wood. A rate of annas three per cubic foot of timber in the round delivered along cart-tracks in the coupes would appear to be a reasonable one both from the point of view of the local purchasers and the department.

(*b*) The monopoly to buy all softwood from the reserved forests of the district should be given to a reliable and enterprising contractor so that he may be able to compete with foreign supplies and instal necessary machinery for sawing into frames *in situ*.

(*c*) The privately owned saw mill at Markapur is in an unorganized and unsatisfactory condition ; the mill should be placed on a sounder basis, with state aid if necessary, and experienced hands should be employed to operate it.

Our resources of softwood form a small percentage of the total requirements of the industry and steps should be taken immediately to form plantations of softwood species in accessible and suitable localities. Besides, an investigation should be carried out into the possibilities of utilizing other species occurring locally, e.g., *Odina wodier*, *Grewia* species, *Kydia calycina*, *Cochlospermum gossypium*, *Wrightia tinctoria*, etc. Recently slate frames have been made out of bamboo, *Dendrocalamus strictus*, at apparently low cost and if this should prove satisfactory to the slate makers, it holds out great promise as some of the bamboo areas which remain at present unexploited may become valuable.

375. Apart from the forest point of view the slate industry at Markapur, which is a lucrative cottage industry, needs organizing on a sounder basis in the interests of local economy. The industry employs about 300 people daily and forms a source of supplementing the income from land which is low. The total value of the industry is about Rs. 1,50,000. The price of the slates has come down from Rs. 22–8–0 per case of four dozens in 1922 to its present level of Rs. 2–8–0 per case. Though the price has slumped the total output per annum has increased from 10,000 cases in 1922 to 36,000 cases in 1938. This decline in price is not attributable to competitive foreign supplies but to local unhealthy competition, lack of organization and deterioration in the quality of the finished product. Foreign slates command a better sale value due to their superior quality. Directions in which the industry may be improved are—

(*a*) Improve the quality of the product and insist on the slate makers conforming to certain minimum specifications.

(*b*) Afford facilities for *bona fide* slate manufacturers to obtain licences for prospecting for slates. At present supplies are obtained from private lands, shrotr'yams, at somewhat high seigniorage rates compared to Government rates.

(*c*) Organize the slate industry on a co-operative basis so as to eliminate unhealthy competition and to afford better marketing facilities.

376. *Constitution.*—Areas which contain appreciable growth of softwood species and which are accessibly situated to make exploitation remunerative have been included in this working circle.

377. *Area.*—The area of the working circle is 54,973 acres.

378. *Character of the vegetation.*—*Givotia rottleriformis* occurs scattered in the midst of superior deciduous species. Trees of marketable size are occasionally found, middle girth classes appear deficient and lower girth classes and regeneration appear to be scanty. Trees attain a height of about 30 feet and a girth of 48 inches. *Gyrocarpus jacquini* occurs in gregarious patches diffusely scattered in the midst of inferior deciduous or poor quality superior deciduous type of forest. Trees attain a height of 35 to 40 feet and a girth of 5 to 6 feet. Large trees are fairly abundant, middle girth classes appear satisfactory while lower girth classes are moderately represented. *Bombax malabaricum* occurs diffusely mixed with superior timber species. In favourable situations trees attain large dimensions. *Sterculia urens* occurs sometimes in groups and in some places scattered in the midst of superior timber species and along stream banks and on rocky exposed slopes. Trees under favourable conditions attain large dimensions, the growth habit is generally clean and straight. Trees 3 feet and above in girth are fairly represented while lower girth classes and regeneration are satisfactory. *Cochlospermum gossypium*, another softwood species, which is not utilized by the slate industry at present, occurs gregariously and fairly extensively in the low dry fuel forests along the foot hills and in portions of the pole forests. Such areas have not, however, been included in the working circle as there is no demand for this species at present.

379. *Felling series.*—Three felling series have been constituted one in each of the ranges of Dornal, Gundlakamma and Turimella. Natural features have, as far as possible, been adopted for boundaries. The area of each series is given below :—

Series.	Area in acres.	Remarks.
1 Dornal range series	22,000	Distributed in 7 blocks.
2 Gundlakamma range series	14,005	,, 3 ,,
3 Turimella range series	18,968	In one block.
Total	54,973	

Under existing plans there are only two series, one in Dornal and the other in Turimella range, the series in Gundlakamma range has been newly constituted.

SECTION 2.—ANALYSIS AND VALUATION OF THE CROP.

380. *Analysis.*—The position of mature trees, i.e., trees of and above 3 feet in girth of softwood species was marked on the field maps approximately in each compartment at the time of preliminary stock-mapping of the areas by the working plans party. Coupes have been constituted with reference to the distribution of the trees

as shown on the field maps and also with an eye to extraction facilities. The position of the trees has not been shown on the stock-maps as it will be cumbersome. Enumerations in one-foot girth classes of all trees of *Givotia rottleriformis* were made over an area of 496 acres in the Gundlakamma range and the results are embodied in the following statement :—

Girth class.	Number of trees.	Girth class.	Number of trees.
1 to 2 feet	208	4 to 5 feet	108
2 to 3 „	293	Over 5 „	42
3 to 4 „	250		

SECTION 3.—METHOD OF TREATMENT.

381. *System.*—Exploitation will be on a selection basis, with an exploitable girth limit. Natural regeneration will be depended upon to replace the trees removed in selection fellings and small plantations will be raised in suitable and readily accessible localities for increasing our resources in softwoods.

382. *Exploitable species.*—At present exploitation will be confined to trees of the following species :—

Givotia rottleriformis (Thella poliki),
Gyrocarpus jacquini (Kumara poliki), and
Bombax malabaricum (Buruga).

Under the previous working plans the exploitation of *Sterculia urens* (Yerrapoliki) trees was also undertaken, but as the species is more valuable for the gum it produces and is not much liked by the slate manufacturers, its exploitation will be discontinued.

383. *Exploitable girth.*—The exploitable girth will be 42 inches over bark at breast height. Market requirements are for billets of wood between 3½ and 4½ feet in girth for conversion into slate frames. A girth limit of 42 inches at the base of the tree was adopted in the working plan by Mr. Anantanarayana Sarma.

384. *Felling cycle.*—A felling cycle of ten years is prescribed based on administrative convenience. The ideal one would be an annual felling cycle but the area to be gone over would be extensive. The average annual coupe under a ten-year cycle will not exceed 2,200 acres, which the marking officer can conveniently manage. A felling cycle of ten years was adopted in Mr. Anantanarayana Sarma's working plan.

385. *Coupes.*—Each felling series is divided into ten annual coupes with natural features as boundaries. They are shown on the detailed maps accompanying this plan. The coupes are numbered serially from I to X. A detailed description of the boundaries of each coupe is given under ' Statement of fellings,' section 5.

386. *Yield.*—Any forecast of yield can at best be only a rough one as the softwood trees occur scattered in the midst of other species. Enumerations made in the Gundlakamma range in a somewhat favourable locality revealed one exploitable tree in every 2 acres of area enumerated. A rough conservative estimate of yield per annum is given below for guidance in the preparation of estimates :—

Range.	Area of coupe in acres.	Forecast of trees per acre.	Forecast of yield. Number of trees.	Cubic feet.
(1)	(2)	(3)	(4)	(5)
Gundlakamma	1,400	One tree in every 4 acres	350	3,500
Turimella	1,890	One in every 12 acres	150	1,500
Dornal	2,200	One in every 20 acres	110	1,100
				6,100

NOTE.—It has been assumed that an exploitable tree will yield about 10 cubic feet.

SECTION 4.—METHOD OF EXECUTING THE FELLINGS.

387. *Exploitation.*—Annually one coupe will be taken up for exploitation in the serial order commencing from number one. Demarcation of the annual coupes will not be necessary as natural features have been adopted as boundaries. The working plan prescribes only the sequence in which the coupes are to be worked without assigning them to definite years of working. If, therefore, a coupe remains unexploited in one year, it will be taken up for exploitation in the following year and this will not constitute

a deviation requiring administrative sanction. If, however, a coupe cannot be exploited for valid reasons to be recorded in the Control Journal, the next coupe may be taken up for exploitation with the previous approval of the Conservator.

388. *Marking.*—All trees of exploitable species of and above the exploitable girth mentioned above will be enumerated and numbered serially by running narrow strips from one end of the annual coupe till it is completely gone over. The number on the tree, the species, its girth at breast height and the estimated length of utilizable bole will be recorded at the time of marking in the timber register. When the tree is felled its mid-girth and actual outturn will be recorded in the appropriate columns of the timber register.

389. *Agency of exploitation.*—The agency of exploitation will be left to the discretion of the District Forest Officer but if departmental exploitation is undertaken forward contracts should be entered into before commencement of the fellings. A monopoly to buy all softwood from the division for a period of years at a reasonable rate per cubic foot may be given to a reliable contractor. Normally marked trees will be sold to a contractor who will do the felling, conversion and transport. Chenchu labour will be employed on exploitation operations in localities where they exist whatever the agency of exploitation may be. The bark should not be removed from the logs.

SECTION 5.—STATEMENT OF FELLINGS.

390. The following statement of fellings shows the order in which the coupes are to be worked and their area and gives a description of their boundaries :—

Coupe number.	Area in acres.	North.	East.	South.	West.
(1)	(2)	(3)	(4)	(5)	(6)
		Dornal Range Series.			
I. S.I. sheets Nos. 34 and 38.	2,126	Starting from a point on the top of a hillock half a mile west of △2604 Madduleni-konda, along the ridge △2604 Madduleni konda, down the spur from △ 2604 till it meets Rollapenta vagu near 1600 b ; up a streamlet to ·2210 and the ridge to the top of a hill about half a mile east of ·2210.	Along the ridge ·2420, △2419 ; down a feeder and a streamlet to join the Mantrala vagu.	Up the Mantrala vagu, the Mogilutla vagu and a streamlet to △ 2534 Katula Devarakonda.	Down the spur from △ 2534 Kattula Devarakonda to Kortikanama; thence up a spur leading to ·2410, the r dge ·2410, ·2350 b, to the starting point.
II. S.I. sheets Nos. 43 and 44.	2,680	Starting from the junction of the common boundary between Ganjivaripalli and Dornal ranges and the Chintala-Peddarutla pilgrim path, along the common range boundary to ·2210.	A line to ·2230, ridge ·2230, ·2230, △2270 ; down a streamlet west of ·1820 to join the Ralla vagu.	Up the Ralla vagu, the Pilligundla vagu to its junction with the Nippulagundam vagu.	Up the Nippulagundam vagu and a streamlet and a feeder to the Chintala-Peddarutla pilgrim path ; the pilgrim path to the starting point.
III. S.I. sheet No. 39.	950	Starting from the junction of the Medigundam vagu and Cumbum Reserved Forest line, along the said reserved forest line to a streamlet from Sudda kuruva.	Up the streamlet to ·1940 Sudda kuruva; up the spur to △ 2050 ; the ridge △ 2050, ·2150.	Down a streamlet and up another streamlet to ·2100 ; down another streamlet to Madapu utla ; up the spur to △2054 ; down a streamlet to the Medigundam vagu.	Down the vagu to the starting point.
IV. S.I. sheet No. 44.	3,440	Starting from the junction of the divisional boundary with the common boundary between Ganjivaripalli and Dornal ranges, along the common range boundary till it meets the Jangamiddela penta-Thummalabailu footpath.	Up a spur leading to △2701 ; the ridge △2701, ·2490, △2501 ; down a spur and a streamlet to the Yerragundam vagu.	Up the said vagu to meet the Chintala-Peddacheruvu footpath ; the said footpath to the divisional boundary.	The divisional boundary to the starting point.
V. S.I. sheet No. 38.	458	Starting from the junction of the divisional boundary and the Rollapenta ghat road, along the road till it crosses a streamlet at the 61st mile 3rd furlong.	Up the streamlet to its source and down another streamlet to the divisional boundary.		Do.
VI. S.I. sheets Nos. 33, 34 38 and 39.	1,875	Starting from ·2250, a point on the Narlapaya-Nagayyakunta fire line, along the ridge ·2250, ·2300 ; down a streamlet to the Cumbum Reserved Forest boundary line near Ayyanna kunta.	The reserved forest boundary line up to the Sim's line ; the Sim's line to the Kurapenta vagu.	Up the vagu and the Mantrala vagu to a streamlet east of the Chinnamantrala rest-house.	Up the streamlet till it crosses the Chinnamantrala-Nallagunta road ; the road to the sixth mile ; up the spur leading to ·2050 through ·1380 ; the ridge ·2050, △2322, to the starting point.

Coupe number. (1)	Area in acres. (2)	North. (3)	East. (4)	South. (5)	West. (6)
		Dornal Range Series—cont.			
VII. S.I. sheet No. 39.	3,128	Starting from △2534 Kattula Devarakonda, down a streamlet; the Mogilutla vagu and the Mantrala vagu to a streamlet from ·2070.	Up the streamlet to ·2070; an arbitrary line along a feeder streamlet and through ·1730 b to meet the Undragundalapenta path.	Down a streamlet and an arbitrary line to the streamlet from Mogilutla; up the said streamlet and its feeder to meet the Undragundala penta footpath; the footpath for about a furlong; an arbitrary line to ·2241; down the spur to meet a streamlet; down the streamlet, and up the Mogilutla vagu till it crosses the Maddipenta-Chinnamantrala road near the 11th mile 1st furlong; the road for about 6 furlongs till it meets a streamlet; up the streamlet to its junction with a feeder from ·2670.	Up the feeder to ·2670 the ridge ·2670, ·2790, △2721, 2480 and △2534 Kattula Devarakonda, the starting point.
VIII. S.I. sheet Nos. 38, 39 and 44.	1,898	Starting from ·2420, along the ridge ·2480, ·2420, ·2400, ·2410, △2339, ·2120, to the Thummalabailu-Peddachama bridle-path.	The bridle-path; the ridge △2388 and ·2280; down a streamlet to the Sama kalva; up the said kalva to the Peddachama-Nallamadugu road.	The road to a streamlet from ·2420 near the 4th mile 6th furlong.	Up the streamlet to ·2420 the starting point.
IX. S.I. sheet Nos. 38, 39 and 44.	1,595	Starting from the junction of the Kudupa fire line with the Nallamadugu-Peddachama road along the road till its second crossing with the Sama kalva, down the kalva till it joins the Thummalabailu-Chinnachama footpath.	The footpath till it crosses the Peiyali paya.	Up the paya till it crosses the Eguvacherlopalli-Peddachama footpath; the footpath to a spur from ·1980; up the spur; the ridge ·1980, ·2130, ·1940, ·2000, ·2100, ·2190, ·2390; and down a spur to the starting point.	
X. S.I. sheet Nos. 38 and 39.	3,850	Starting from △2791 Peddakonda along the ridge △2791, ·2820, ·2600, ·2560, ·2550, ·2520; down a streamlet to the Mantralamma vagu.	Up the vagu to the Rollapenta ghat road; the road to the Nallagunta footpath; the footpath to the reserve forest boundary.	The reserve forest boundary to a streamlet from ·2300; up the streamlet to ·2300; the ridge ·2300 and ·2250; thence the Narlapaya-Nagayyakunta fire line till it crosses a streamlet.	Down the streamlet to the Mantralamma vagu; down the Mantralamma vagu and up a streamlet to its source △2791 Peddakonda, the starting point.
		Gundlakamma Range Series.			
I. S.I. sheet Nos. 10 and 13.	966	Starting from the junction of the Diguvametta-Malakondapenta road and the Chapala kunta kalvai, along the said kalvai to the Sagal eru.	The Sagal eru to meet the Gundlakamma-Turimella common range boundary; the said boundary; the Cumbum reserve forest line to meet the Sagal eru again.	Up the Sagal eru to meet a stream to the south of ·1170; the said stream to meet the Mokala kuruva fire line.	The said fire line and up a streamlet to the east of ·1570; an arbitrary line eastwards to meet the Diguvametta-Malakondapenta road through ·1570; the said road to the starting point.
II. S.I. sheet No. 10.	1,045	The Jangam kunta ..	The south railway guide line to meet the Giddalur-Gundlakamma common range boundary; the said common range boundary to the Gaimetaka kalvai; the said kalvai to its source.	From the said source up the spur to △1700; down the spur to the source of a stream about 2 furlongs to the south-west of △1700.	The said stream to a point on the Polikimanibanda fire line to the south of Turimallayya kunta; the said fire line to meet the Tekulapenta fire line; the said fire line to meet the Jangamkunta, the starting point.
III. S.I. sheet Nos. 10 and 13.	1,781	Starting from the stream to the north of the junction of a footpath from ·1940 and the divisional boundary, along the stream to the north railway guide line; the said guide line to a point due west of ·1500; up the spur to ·1500.	From the said point along the saddle and the ridge to ·1440; down the spur south-east to the Dadigundala vagu; the said vagu to the south railway guide line; the said guide line to meet the Jangamkunta.	Thence up the spur and along the ridge to △1756; down the spur and a streamlet to meet the Jangambhavi kalvai; down the said kalvai to its first tributary; up the said tributary and the spur through △1908 to the divisional boundary along the saddle.	The divisional boundary to the starting point.
IV. S.I. sheets Nos. 13 and 18.	1,546	Starting from △2542 Kolimikonda a line down the spur and a streamlet to meet the Donetti kalvai; the said kalvai to meet the Gaval vagu; the the said vagu to the Lokki vagu; the said vagu to meet the Iskagundam-Malakondapenta road.	The said road to meet the Sagal eru.	The Sagal eru to its junction with a stream between ·1550 and ·1640; thence up the spur and along the ridge through ·2030 to meet the junction of a stream and its streamlets about two furlongs to the south-east of △2397 Maikaltippa; up the said streamlet and the spur to △2397; thence along the ridge to a point about ten chains to the south west of 2130.	From the said point down the spur to meet ·2130 on the Regumanipenta fire line; thence up the spur to ·2380 and through the saddle and the ridge to △2542, the starting point.

Coupe number. (1)	Area in acres. (2)	North. (3)	East. (4)	South. (5)	West. (6)
		Gundlakamma Range Series—cont.			
V. S.I. sheet Nos. 13 and 18.	1,180	Starting from a hill △2711 down a stream to the Gaval vagu; up the said vagu for about two furlongs and an arbitrary line up the spur to ·2270.	From ·2270 and the saddle and the ridge passing through ·2230 to the Guval-penta fire line; the said fire line to meet the Iskagundam-Malakondapenta road; the said road to meet the Lokki-vagu near the tenth mile; the said vagu to meet the Gaval vagu.	The Gaval vagu to meet the Donetti kalvai; the said kalvai to meet a streamlet to the south of ·2350.	The said streamlet to ·2350 down a streamlet to the Nerada kalvai; thence up the spur to ·2350; thence down a streamlet to the Sarasutla kalvai; the said kalvai and a streamlet to the starting point.
VI. S.I. sheet Nos. 13 and 18.	1,790	Starting from the junction of the Iskagundam-Malakondapenta road and the Chitrangi-Neeradugundam fire line, along the said fire line to ·2190.	From ·2190 up the spur to △2322 Pillangoil konda; down the spur and a streamlet to the Gorud vanka; down the said vanka to the east outer fire line.	The east outer fire line to meet the Malakondapenta-Iskagundam road.	The said road to the starting point.
VII. S.I. sheet No. 18.	1,741	From the junction of the south catchment area fire line and the Tetala kalvai, along the said kalvai to the Iskagundam-Malakondapenta road.	The said road to meet the south catchment area fire line; the said fire line up to ·2590; thence along the ridge to ·2270.	From ·2270 down the spur to the Gavallapenta stream the said stream to meet the south outer boundary line; the boundary line to the Rakasipenta fire line.	The Rakasipenta fire line to the starting point.
VIII. S.I. sheet Nos. 18 and 22.	1,388	Starting from the junction of the Iskagundam-Obulesunipenta road and a streamlet to the north of the Iskagundam Chenchu gudem, along the said streamlet to the Gundlakamma river; the said river.	The said river to meet the Veyyavula penta fire line; the said fire line to meet the south catchment area fire line.	The south catchment area fire line till it deviates from the Malakondapenta-Iskagundam road.	The said road to the starting point.
IX. S.I. sheet Nos. 18 and 22.	1,232	Starting from the junction of the Iskagundam-Obulesunipenta road and the Buggamamidi stream; along the said stream to the Gundlakamma river; the said river to the Nallamadugu stream; up the said stream to ·2030 b and along the ridge to △2591; thence down the spur to the Kuruthatti kalvai; and the said kalvai.	The said kalvai to the Gundlakamma river.	The Gundlakamma river up to a streamlet to the north of the Chenchu gudem; the said streamlet to the Iskagundam-Obulesunipenta road.	Do.
X. S.I. sheet Nos. 18 and 22.	1,336	Starting from the junction of the Kuruthatti kalvai and its streamlet to the east of ·2110 along the said streamlet to △2466 Idalakonda; thence along the ridge through ·2240 to the Turimella-Gundlakamma common range boundary.	The said common range boundary to the Midijari fire line.	The Midijari fire line up to ·2190; thence down the spur and a streamlet to its main stream running down Torechinta bailu; thence up the stream for about 7 furlongs; thence up another stream and spur to △2287 down the spur and a stream to the Gundlakamma river.	The Gundlakamma river and the Kuruthatti kalavai to the starting point.
		Turimella Range Series.			
I. S.I. sheet Nos. 22 and 27.	1,758	Starting from the junction of the Maddipenta-Obulesunipenta bridle-path and the Bodivani Banda vanka along the said vanka to ·1130.	Thence an arbitrary line up the spur to ·1890; down the spur to meet Kanithimukkula sorova stream in a south-easterly direction; thence up the spur to meet the Maddipenta-Obulesunipenta bridle-path at its narrow bend; the said bridle-path to meet the common boundary of Turimella and Gundlakamma ranges.	The said common range boundary to the Tangellapaya vagu.	The Tangellapaya vagu to the starting point.
II. S.I sheet No. 27.	1,868	From the junction of the Pagapade and Maddipenta road, along the Maddipenta road to meet the Jampal eru; the Jampal eru to a point about eight chains to the north of ·1252; thence an arbitrary line due south-east to meet the junction of the Maddipenta-Obulesunipenta bridle-path and the Tangellapaya..	The Tangellapaya to meet the common range boundary between Turimella and Gundlakamma ranges.	The common range boundary to meet a tributary of the stream about 30 chains to the south-west of ·2876.	Down the said tributary to meet another stream from ·1950; up the said stream to its source through the saddle between ·2070 and ·1950 to meet another stream; down the said stream; an arbitrary line to meet another stream; down the said stream to meet the Pogapade road; the said road to the starting point.

Coupe number. (1)	Area in acres. (2)	North. (3)	East. (4)	South. (5)	West. (6)
		Turimella Range Series—cont.			
III. S.I. sheet No. 27.	1,836	Starting from the junction of the Vaddavani vagu and the divisional boundary, along the said vagu to its tributary near ·1370 b; up the tributary and the spur to the south of ·1860; down the spur to the Tigal eru; the said eru to meet the Maddipenta road; the said road to meet the Pogapade road.	The Pogapade road to meet a stream to the east of the Pogapade penta; up the stream and along the contour to meet another stream; up the said stream to its source; up the spur to the source of another stream near ·1950; down the stream to meet another stream to the south of ·1920; up the said stream to the Turimella-Gundlakamma common range boundary.	The said common range boundary to meet the divisional boundary.	The divisional boundary to the starting point.
IV. S.I. sheet Nos. 22 and 27.	1,835	Starting from the junction of a tributary of Bodivani Banda vanka and the Papinenipalli road near the sixth mile, along the said road to a cart-track.	The said cart-track to meet the Sim's line; the Sim's line to the Korala vagu.	The Korala vagu to meet the Turimella-Gundlakamma common range boundary; the common range boundary to meet the Obulesunipenta-Maddipenta bridle-path.	The said bridle-path to its narrow bend; thence an arbitrary line to ·1890; down the spur to the junction of Bodivani Banda vanka and its tributary near ·1130; the said tributary to the starting point.
V. S.I. sheet No. 27.	1,950	Starting from the junction of the Mantralamma cart-track and the stream to the north-west of ·1680 Yelabanda, up the said stream to ·2240; down the spur and a streamlet to meet a stream from Devadarikuruva.	The stream to meet the reserve forest line; the reserve forest line to meet the cart-track near ·1070.	The said cart-track to meet the junction of the Pogapade-Papinenipalli road and the Jampal eru near ·1138.	Up the Jampal eru and its tributary to meet the Mantralamma cart-track; up another cart-track to the starting point.
VI. S.I. sheet No. 27.	1,763	Starting from ·2400 on the divisional boundary, down the spur and a tributary of the Naguti sela; the said sela to meet the Jampal eru.	The Jampal eru to meet the Maddipenta road.	The said road to meet the Tigal eru; the said eru up to about ten chains to the east of ·1860; up the spur to the south of ·1860; down the spur and a streamlet to meet the Voddavani vagu near ·1370; the said vagu to the divisional boundary.	The divisional boundary to the starting point.
VII. S.I. sheet No. 27.	1,876	From a point on the divisional boundary about two furlongs to the east of ·2260, up the spur and along the ridge through ·2420, ·2310, ·1600 to meet the Mantralamma road.	The Mantralamma road to meet the Naguti sela.	Up the said sela and its tributary and up the spur to ·2400 on the divisional boundary.	Do.
VIII. S.I. sheet Nos. 27 and 34.	1,969	Starting from the junction of the divisional boundary and the Turimella and Dornal common range boundary, along the said common range boundary to meet a stream to the east of △2847 and north-west of ·2580.	Up the said stream; the saddle and the ridge to ·2550; down the spur to meet the junction of the Pethallapaya and its tributary; the said paya to meet the Mantralamma road.	The said road towards south-west to meet a foot-path; thence up the spur to ·1600 and along the ridge through ·2310, ·2420, to a point on the divisional boundary about two furlongs from ·2260.	Do.
IX. S.I. sheet No. 27.	1,770	Starting from the junction of the Pethallapaya and Mantralamma road, down the said paya to meet Jampal eru; down the Jampal eru to the first streamlet; up the streamlet and the ridge to △2289; down a streamlet to join another stream from Devadarikuruva.	Down the said stream to meet a tributary from ·2240.	Then up the tributary to ·2240 and down the spur and another streamlet to meet the Mantralamma cart-track; the said cart-track to meet a stream at its junction with another cart-track; down the stream and the Jampal eru to meet a cart-track to the west of ·1138; the said cart-track up to the sixth mile to meet a stream; down the said stream to meet another stream; and up the stream to meet the Maddipenta-Obulesunipenta bridle-path; thence an arbitrary line to the east of ·1252 crossing the road and the Jampal eru; and up the Naguti sela to meet the Mantralamma-Maddipenta road.	The Mantralamma-Maddipenta road to the starting point.
X. S.I. sheet Nos. 27 and 34.	2,343	From the junction of the Turimella-Dornal common range boundary and a stream to the north-west of ·2580, along the said common range boundary to meet the Pogapade road.	The said common range boundary to meet a streamlet about 15 chains to the south of ·1470; up the streamlet to ·2783; down a stream to meet another stream to the south-west ·1550.	The latter stream to meet a tributary from △2289; up the tributary and the spur to △2289, and along the saddle and down the spur and a streamlet to meet the Mogilutla vagu; up the said of vagu and up Pethallapaya to meet the Mantralamma road.	Up the said paya to the junction of a foot-path and another stream; up the spur and the ridge through ·2550 to a stream between ·2780 and △2847 down the said stream to the starting point.

SECTION 6.—SILVICULTURAL REGULATIONS.

391. *Regeneration.*—Natural regeneration is deficient and inadequate to compensate the loss entailed in the removal of exploitable trees. Instead of undertaking artificial regeneration diffusely over extensive areas of felled coupes, intensive concentrated regeneration will be undertaken in suitable and readily accessible localities with a view to replacing the stock removed in fellings, as well as to increase the softwood resources of the division. Though exploitation has been prescribed in the Turimella Range forests artificial regeneration is not prescribed in them due to the present unsatisfactory communications which will make the plantations economically unremunerative. The district board authorities have under contemplation the construction of a road from Cumbum to Pappinenipalli which when constructed would make the forests of Turimella range generally more valuable and the raising of softwood plantations in that range would be financially remunerative. Concentrated regeneration will for the present be undertaken only in the ranges of Dornal and Gundlakamma and when communications are bettered planting may be done in Turimella range also.

392. *Blocks.*—Three blocks of 50 acres each, one in each of the three ranges of Dornal, Gundlakamma and Turimella, have been chosen for artificial regeneration during the period of this plan but in the Turimella block operations will be commenced only when road conditions become favourable. The blocks are situated on good, loamy soil in localities receiving an annual rainfall of about 35 inches and are close to roads. The blocks are shown on the detailed maps accompanying this plan.

393. *Treatment.*—Annually an area of 5 acres in each of the blocks in Dornal and Gundlakamma ranges will be selected progressively from one end of the block in the month of January and will be demarcated by a cleared line six feet wide all round it. The regeneration area will be clearfelled in January, any timber that may be marketable at a profit will be extracted and the balance material will be piled up in strips to a width of 20 feet and to a height of 3 feet after compacting. The ' rab ' strips will be laid out in the direction of the future planting lines and as far as possible along contours and will be at a distance of 60 feet from centre to centre. If, however, enough material is not available for all the ' rab ' strips intermediate ones may be left out. The heaped up material will be burnt in the month of March care being taken to see that the fire does not escape into the adjoining forest. The planting espacement will be 12 feet by 12 feet. Towards this end lines will be laid out at a distance of 12 feet apart in such a manner that in each burnt strip two lines may fall, and between the strips in the unburnt portion three lines. Stakes will be driven at intervals of 12 feet along the lines. The soil round the stakes to a distance of one and a half feet and a depth of 6 inches will be worked up soon after the burning and staking is done.

394. *Sowing and planting.*—Towards the end of May seeds of *Ailanthus excelsa* and *Bombax malabaricum* will be sown near the stakes after scratching the soil. One quarter of the area will be sown with *Ailanthus excelsa* and another quarter with *Bombax malabaricum.* About the middle of June stumps of *Givotia rottleriformis* will be planted in crowbar holes over the remaining half of the area. The correct technique of regenerating softwood species is somewhat obscure and only recently the Provincial Silviculturist has started experiments on the method of germinating *Givotia rottleriformis* which appears to give difficulty. Experiments made in Kurnool South (old) indicate that satisfactory germination of *Givotia rottleriformis* may be obtained if the seeds are sown in a prepared seed bed at a depth of 1 to 2 inches and covered with straw and thorns and copiously watered every day in the morning till germination takes place. The seedlings grow rapidly and develop a thick carrot like root. The planting of stumps three months old has given good results though on a small scale in one of the rabs in the Maddipenta Timber Series and the resultant growth for two years is 15 feet in height and 8 inches in girth. Probably one year old stumps may be too big to plant out. This is a matter on which experiment should be made. Another method of inducing germination of *Givotia rottleriformis* will be to ferment the seeds by dipping them in cold water for 48 hours and keeping them moist covered with straw out of free air circulation. *Bombax malabaricum* and *Ailanthus excelsa* are best raised by sowing 10 to 15 seeds of the species at each patch.

395. *Weeding.*—The regeneration area will be weeded and soil worked as often as necessary in the first year and a final soil working will be done in January, before the hot weather. Replacement of casualties will be done in the first year only. Weeding and soil working will be done in the second year in respect of backward plants. Subsequent tending and thinning will be done as they become necessary.

396. *Kumri.*—The regeneration block in Dornal range is situated about a mile from the Peddamantrala Chenchu gudem and the land is suitable for cultivation. The

chenchus of Peddamantrala expressed their willingness to ' kumri ' the area. If they are willing to do it, a preliminary ploughing after burning, weeding and soil working in the first year will be done by them free of cost in return for the permission to raise a field crop on the area. Should conditions permit of it, which is doubtful, a second year's cultivation may be allowed on similar terms.

397. *General.*—The above instructions based on local experience and practice are to serve more as a guide to the management than as regular prescriptions. Full discretion will be given to the District Forest Officer to vary or deviate from them in the light of experience gained. The necessity to be in touch with the Provincial Silviculturist on matters relating to regeneration is emphasized. The objective aimed at should be to obtain full stocking and maximum growth in the first year itself.

SECTION 7.—OTHER REGULATIONS.

398. *Grazing.*—The entire working circle will be open to grazing with the exception of regenerated areas which will be closed to grazing during the period of the plan.

399. *Fire protection.*—Regenerated areas will be firetraced by scraping a line six feet wide along the periphery, in January, every year, for a period of ten years from the year of formation.

400. *Control.*—A Control Book, a Regeneration Ledger, and a Control Map showing the area regenerated and the species planted will be maintained.

CHAPTER VI.—WORKING PLAN FOR THE BAMBOO WORKING CIRCLE.

SECTION 1.—GENERAL CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF THE VEGETATION.

401. *Constitution.*—The bamboo working circle embraces all areas in the division where bamboo occurs in commercially exploitable quantities. Large non-bamboo areas have necessarily been included in the working circle so as to obtain well defined natural features as boundaries for series. Small scattered patches have been excluded from the scope of this working circle as the patches are awkward for inclusion in any of the felling series conveniently and in some cases are situated in remote inaccessible localities as for instance in the Gundlakamma and Ganjivaripalli ranges. The area so excluded is 2,296 acres of effective bamboo area distributed among the ranges as shown below :—

Range. (1)	Area excluded in acres. (2)	Remarks. (3)
Dornal	Nil.	
Gundlakamma	1,449	Inaccessible areas.
Giddalur	38	Scattered.
Ganjivaripalli	424	Inaccessible.
Turimella	350	Inaccessible and scattered patches.
Markapur	35	Scattered patches.
	2,296	

402. *Distribution.*—Bamboos occur extensively in the ranges of Dornal, Gundlakamma, Giddalur, Turimella and Ganjivaripalli. Both the species *Bambusa arundinacea* and *Dendrocalamus strictus* are found, the former occupying about 5 per cent of the total effective bamboo area in the division and is largely confined to Dornal range. *Bambusa arundinacea* flowered and seeded gregariously between the years 1935 and 1938 over the entire division and the regrowth may not be suitable for exploitation during the period of this plan. *Dendrocalamus strictus* flowered gregariously in the localities of Chinnamantrala, Peddamantrala, etc., in Dornal range and in others only sporadically. The fairly common impression that *Dendrocalamus strictus* flowers only sporadically is incorrect. Regeneration of bamboo in localities where it has seeded and died is coming up profusely in many places. The extent of flowered bamboo area is about one-tenth of the total bamboo area. The following statement shows the distribution of the two species of bamboo in two density classes in the various series and coupes composing the working circle.

Serial number and name of the series.	Coupe number.	Total area of the coupe in acres.	Effective bamboo area in acres. Dendrocalamus strictus. Dense.	Effective bamboo area in acres. Dendrocalamus strictus. Sparse.	Effective bamboo area in acres. Dendrocalamus strictus. Total.	Effective bamboo area in acres. Bambusa arundinacea. Dense.	Effective bamboo area in acres. Bambusa arundinacea. Sparse.	Effective bamboo area in acres. Bambusa arundinacea. Total.	Total effective area in acres.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
					Dornal Range.					
1 Peddachama ..	I ..	6,747	156	462	618	5	..	5	623	
	II ..	10,113	49	84	133	778	..	778	911	
	III ..	8,009	569	148	717	131	..	131	848	
	Total ..	**24,869**	**774**	**694**	**1,468**	**914**	..	**914**	**2,382**	
2 Peddamantrala.	I ..	2,260	916	224	1,140	71	..	71	1,211	
	II ..	2,954	1,292	54	1,346	44	..	44	1,390	
	III ..	9,230	653	125	778	87	111	198	976	
	Total ..	**14,444**	**2,861**	**403**	**3,264**	**202**	**111**	**313**	**3,577**	
3 Chinnamantrala.	I ..	11,038	1,123	731	1,854	..	..	..	1,854	
	II ..	4,081	1,374	344	1,718	144	..	144	1,862	
	III ..	2,521	1,744	539	2,283	68	..	68	2,351	
	Total ..	**17,640**	**4,241**	**1,614**	**5,855**	**212**	..	**212**	**6,067**	
4 Chilakacherla ..	I ..	1,538	28	..	28	47	228	275	303	
	II ..	8,717	27	119	146	58	128	186	332	
	III ..	8,945	..	202	202	90	..	90	292	
	Total ..	**19,200**	**55**	**321**	**376**	**195**	**356**	**551**	**927**	
Total for Dornal Range ..		**76,153**	**7,931**	**3,032**	**10,963**	**1,523**	**467**	**1,990**	**12,953**	The area of flowered bamboos (both *Dendrocalamus strictus* and *Bambusa arundinacea*) is 4,149 acres and is included in the total area.
					Gundlakamma Range.					
5 Iskagundam ..	I ..	4,499	562	1,272	1,834	..	..	..	1,834	
	II ..	4,832	396	1,420	1,816	..	..	..	1,816	
	III ..	3,663	1,236	696	1,932	..	..	..	1,932	
	Total ..	**12,994**	**2,194**	**3,388**	**5,582**	..	..	..	**5,582**	
6 Obulesunipenta.	I ..	4,568	126	956	1,082	..	..	..	1,082	
	II ..	7,992	195	895	1,090	..	..	..	1,090	
	III ..	5,507	309	793	1,102	..	..	..	1,102	
	Total ..	**18,067**	**630**	**2,644**	**3,274**	..	..	..	**3,274**	
7 Malakondapenta.	I ..	3,986	1,826	318	2,144	10	..	10	2,154	
	II ..	7,504	927	1,005	1,932	11	..	11	1,943	
	III ..	2,476	1,403	521	1,924	..	..	..	1,924	
	Total ..	**13,966**	**4,156**	**1,844**	**6,000**	**21**	..	**21**	**6,021**	
8 Tunnel	I ..	4,436	148	499	647	..	..	..	647	
	II ..	2,699	102	505	607	..	..	..	607	
	III ..	6,835	..	696	696	..	..	..	696	
	Total ..	**13,970**	**250**	**1,700**	**1,950**	..	..	..	**1,950**	The area of flowered *Dendrocalamus strictus* is 228 acres and is included in the total.
Total for Gundlakamma Range.		**58,997**	**7,230**	**9,576**	**16,806**	**21**	..	**21**	**16,827**	
					Giddalur Range.					
9 Bodi	I ..	4,700	569	82	651	4	..	4	655	
	II ..	2,941	501	158	659	6	..	6	665	
	III ..	3,705	553	..	553	..	..	..	553	
	Total ..	**11,346**	**1,623**	**240**	**1,863**	**10**	..	**10**	**1,873**	
10 Othumadugu ..	I ..	3,894	1,134	103	1,237	..	..	..	1,237	
	II ..	3,290	1,211	10	1,221	..	..	..	1,221	
	III ..	3,390	1,306	54	1,360	..	..	..	1,360	
	Total ..	**10,574**	**3,651**	**167**	**3,818**	..	..	..	**3,818**	
11 Guvvalapenta ..	I ..	2,925	817	..	817	..	..	..	817	
	II ..	4,184	766	..	766	2	..	2	768	
	III ..	5,920	660	402	1,062	..	..	..	1,062	
	Total ..	**13,029**	**2,243**	**402**	**2,645**	**2**	..	**2**	**2,647**	
12 Maduva ..	I ..	1,194	..	180	180	..	..	..	180	
	II ..	1,170	..	199	199	..	..	..	199	
	III ..	2,550	..	203	203	..	..	..	203	
	Total ..	**4,914**	..	**582**	**582**	..	..	..	**582**	
Total for Giddalur Range ..		**39,863**	**7,517**	**1,391**	**8,908**	**12**	..	**12**	**8,920**	There was no bamboo flowering in the Range.
					Gajivaripalli Range.					
13 Chinnarutla ..	I ..	7,493	43	224	267	3	..	3	270	
	II ..	10,484	198	120	318	13	..	13	331	
	III ..	11,526	168	43	211	17	..	17	228	
	Total ..	**29,503**	**409**	**387**	**796**	**33**	..	**33**	**829**	NOTE.—Flowered area of 45 acres is included in the total.
14 Nekkanti ..	I ..	10,333	704	..	704	46	..	46	750	
	II ..	7,561	930	52	982	134	..	134	1,116	
	III ..	7,746	763	9	772	24	..	24	796	
	Total ..	**25,640**	**2,397**	**61**	**2,458**	**204**	..	**204**	**2,662**	
Total for Ganjivaripalli Range.		**55,143**	**2,806**	**448**	**3,254**	**237**	..	**237**	**3,491**	The area of flowered *Bambusa* is 204 acres and is included in the total area.

Serial number and name of the series.	Coupe number.	Total area of the coupe in acres.	Effective bamboo area in acres. *Dendrocalamus strictus.*			*Bambusa arundinacea.*			Total effective area in acres.	Remarks.
			Dense.	Sparse.	Total.	Dense.	Sparse.	Total.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
				Turimella Range.						
15 Maddipenta ..	I ..	7,929	2,198	130	2,328	14	..	14	2,342	
	II ..	4,445	2,254	74	2,328	..	20	20	2,348	
	III ..	5,231	2,170	475	2,645	..	..	..	2,645	
	Total ..	**17,605**	**6,622**	**679**	**7,301**	**14**	**20**	**34**	**7,335**	
16 Turimella plains.	I Velagala-paya.	10,072	945	305	1,250	..	..	..	1,250	
	II Papineni-palli.	6,676	124	403	527	258	4	262	789	
	III Lokki.	7,530	486	394	880	..	..	..	880	
	Total ..	**24,278**	**1,555**	**1,102**	**2,657**	**258**	**4**	**262**	**2,919**	
Total for Turimella Range ..		**41,883**	**8,177**	**1,781**	**9,958**	**272**	**24**	**296**	**10,254**	Includes 296 acres of flowered *Bombusa* and 88 acres of *Dendrocalamus.*
				Markapur Range.						
17 Bommilingam ..	I ..	4,402	..	129	129	..	..	..	129	
	II ..	2,637	..	130	130	..	..	..	130	
	III ..	5,223	..	109	109	..	..	..	109	
	Total ..	**12,262**	..	**368**	**368**	..	..	..	**368**	
Total for Markapur Range ..		**12,262**	..	**368**	**368**	..	..	..	**368**	Flowered area is 33 acres.

403. *Area.*—The area of the working circle is 284,301 acres.

404. *Felling series.*—The working circle is divided into 17 felling series. Each felling series forms a compact block and falls entirely in one range. With the exception of slight modifications, the integrity of the former series has been maintained. Slight changes in the boundaries of the coupes have been effected where large disparities in effective bamboo areas were noticed and also where boundaries did not follow well defined natural features. The names of the series and numbers of the coupes as adopted in the previous working plans have been as far as possible, maintained. Natural features have been chosen both for series and coupe boundaries. No account has been taken of the various degrees of recent flowerings in the bamboo areas in the allocation of the series and coupes. Flowered bamboo areas have been included in the working circle as they will continue to be bamboo areas when regeneration comes up, although no exploitation may be possible in them during the period of this plan. The areas and distribution of the seventeen felling series together with a description of their boundaries are given in the following statement. The effective bamboo area in each series as computed from the stock maps is also given.

Serial number	Total area of the series in acres.	Effective bamboo area in acres.	Description of the series boundary.
(1)	(2)	(3)	(4)
			Dornal Range.
1	24,869	2,382	Peddachama Felling Series (S.I. sheet Nos. 38, 39, 43, 44 and 45). *North.*—Starting from the north-west corner of the Range, along the common boundary between Dornal and Ganjivaripalli Ranges to the Telugurayani-cheruvu-Chintala bridle path. *East.*—Along the bridle path to Chintala-Pedda Bommalapuram cart-track; the cart-track to a streamlet west of ·1100; down the streamlet to the Ralla vagu. *South.*—Up the Ralla vagu and the Pilligundla vagu to the Podavulennu kalva; up the kalva to its source and down another streamlet to join the Peiyali Paya; up the Paya and a streamlet to meet the Cherlopalli slope fire line at the abandoned Podavulennu penta, westwards along the fire line to the Chintala-Eguvacherlopalli bridle path near ·1960; the said bridle path for about 2½ furlongs to a spur leading to △ ·2372; up the spur △ ·2372; the ridge △ ·2372, ·2460, ·2420, ·2400, ·2510, ·2480, △ ·2507; down a streamlet to the Sama kalva; thence along the Pullalagutla-Nallagunta-Kudupa fire line to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
2	14,444	3,577	Peddamantrala Felling Series (S.I. sheet Nos. 38 and 39). *North.*—Starting from the point where the Divisional boundary and the Pullalagutla-Nallagunta-Kudupa fire line meets, along the fire line to the Sama kalva; thence up a streamlet to △ ·2507; the ridge △ ·2507, ·2480, ·2510, ·2400, ·2420, ·2460, △ ·2372; down the spur to the Peddachama-Eguvacherlopalli foot-path; the foot-path to the Reserved Forest boundary; the Reserved Forest boundary to the Lingamraju vagu; an arbitrary line about two chains parallel to the vagu to meet the Rollapenta ghat road; thence the road up to the 72nd mile 3rd furlong near △ ·903.

Serial number.	Total area of the series in acres.	Effective bamboo area in acres.	Description of the series boundary.
(1)	(2)	(3)	(4)
			Dornal Range—cont.
			East.—Up the spur leading to ·1310, the ridge ·1310, ·1450, ·1390, ·1380, ·1510, ·1720, Narasimhaswami temple, ·1720, till it meets Eastern Nallamalais Block 6 (A.I.) Reserved Forest boundary. *South.*—Along the southern boundary of Eastern Nallamalais Block 6 (A.I.) Reserved Forest; the boundary of Markapur and Cumbum reserves to a foot-path west of ·1130; the said foot-path and the Peddamantrala-Nallagunta foot-path to the ridge from ·1860; the ridge ·1860, △ 1956, ·1890, ·2000, Paluguralla Bodu, △ 2043, ·2130, ·2090 Yeddula thoka, ·2300 and ·2250; thence along the Narlapaya-Nagayyakunta fire line through △ 2483, Peddamanti konda, to the Rollapenta ghat road; the road to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
3	17,640	6,067	Chinnamantrala Felling Series (S.I. sheet Nos. 34 and 38). *North.*—Starting from the junction of the Rollapenta ghat road and the Divisional boundary, eastwards along the road to the Narlapaya-Nagayya-kunta fire line; the said fire line to the Nallagunta-Chinnamantrala road. *East.*—Southwards along the fire line up to ·1700 (*b*) (near Chintakayala-kuruva); a spur leading to ·2050, the ridge ·2050, ·1840, ·2100, Narlapaya-gattu, ·1860, ·1730, ·1890, to the common boundary between Turimella and Dornal ranges. *South.*—The common range boundary to meet the Divisional boundary. *West.*—The Divisional boundary to the starting point.
4	19,200	927	Chilakacherla Felling Series (S.I. sheets Nos. 33, 34 and 39). *North.*—Starting from a point on the Narlapaya-Nagayyakunta fire line where it crosses the ridge ·1550 and ·1720, along the ridge ·1720, △ 1793, ·1630, ·1830, △ 1800 kurapenta konda, ·1730, △ 1765 up to the boundary of Eastern Nallamalais Block 6 (*c*) Reserved Forest; along the reserve boundary line to △ 1884 Bollimidi kuruva; thence the boundary of Cumbum Reserve Forest to the Thummagundam sela. *East.*—Up the Sela to the common boundary between Dornal and Markapur ranges. *South.*—The common range boundary to meet the trijunction of Turimella, Dornal and Markapur at Motamu kunta; thence along the common boundary of Turimella and Dornal ranges to meet the ridge south of ·1890. *West.*—The ridge ·1890, ·1730, ·1860 Narlapayagattu, ·2100, ·1840, ·2050; down a spur to ·1700 (*b*) on the Narlapaya-Nagayyakunta fire line near Chintakayala kuruva; the fire line to the starting point.
			Gundlakamma Range.
5	12,994	5,582	Iskagundam Felling Series (S.I. sheet Nos. 13, 18 and 22). *North.*—Starting from the junction of the Divisional boundary and the north; catchment area fire line, along the said fire line to the Obulesunipenta-Maddipenta bridle path. *East.*—Along the said bridle path to the Iskagundam-Obulesunipenta road; the said road to the South Outer boundary line. *South.*—Along the said South Outer boundary line to the divisional boundary. *West.*—The Divisional boundary to the starting point.
6	18,067	3,274	Obulesunipenta Felling Series (S.I. sheet Nos. 18, 22 and 27). *North.*—Starting from the junction of the Obulesunipenta-Maddipenta bridle path and the North Catchment Area fire line, along the said fire line. *East.*—The said fire line to the Gundlakamma-Turimella common boundary; the said common range boundary to the Medijari fire line; the said fire line to the Gundlakamma river; the said river to the Vontiveerunipenta fire line; the said line to the South catchment area fire line; the latter fire line to the Gundlakamma-Turimella common range boundary. *South.*—The said common range boundary to the East outer fire line; the said fire line to the Malakondapenta-Iskagundam road. *West.*—The Malakondapenta-Iskagundam road; the Obulesunipenta road and the Obulesunipenta-Maddipenta bridle path to the starting point.
7	13,966	6,021	Malakondapenta Felling Series (S.I. sheet Nos. 13 and 18). *North.*—Starting from the junction of the Divisional boundary and the South Outer boundary line; the said line to the Iskagundam-Malakondapenta road; the said road and the East outer fire line to the Gundlakamma-Turimella common range boundary. *East.*—The said common range boundary to the Chapala kunta stream. *South.*—Up the said stream and down the Velugulasela stream to the Doddi-gundla vagu; up the said vagu and a streamlet to the south of ·1700 to meet the ridge south of △ 2366 on the Divisional boundary. *West.*—The Divisional boundary to the starting point.
8	13,970	1,950	Tunnel Felling Series (S.I. sheet Nos. 10 and 13). *North.*—Starting from a point south of △ 2366 on the divisional boundary, down the streamlet south of ·1700; down the Dadigundla vagu and up the stream Velugula sela and down the Chapalakunta kalavai to meet the Gundlakamma-Turimella common range boundary. *East.*—The said common range boundary and the Sagal Eru; the tributary to the south of ·1170; up the said tributary to the Mokala korava fire line; the said fire line to the west of ·1360; thence up the spur and along the ridge through ·1920, ·1860, △ 1853 down to the Nandikanama ghat road; the said ghat road; the North Railway guide line; the Giddalur-Gundlakamma common range boundary to meet the Gaimetaka kalvai and its tributary; up the said tributary to △ 1567; along the ridge to meet the stream near △ 1859; down the said stream to meet the Gundla-kamma-Giddalur common range boundary again. *South.*—The said common range boundary to meet the Divisional boundary. *West.*—The Divisional boundary to the starting point.

Serial number.	Total area of the series in acres.	Effective bamboo area in acres.	Description of the series boundary.
(1)	(2)	(3)	(4)
			Giddalur Range.
9	11,346	1,873	Bodi Felling Series (S.I. sheet Nos. 5 and 6). *North.*—Starting from the foot-path about 8 chains south of Pillalagunda konda △ 1891, along the foot-path eastwards to the Sim's line. *East.*—Along the Sim's line to Populudu Sela; then up the stream to the south of ·1390; up the spur to ·1570; along the ridge to ·1730; then along the foot-path about 45 chains eastwards to ·1810 and ·1710; down the stream to the Medaravanichelima; thence up the spur and along the ridge through ·1800 Chelama konda, ·1600 to the Tadutla vagu; the said vagu to the Sim's line; the Sim's line to the Jangambhavi foot-path; the said foot-path westwards; thence up the spur and along the ridge through ·1580, ·1730, to the Bodi vagu; thence up a stream and along the saddle and down another stream to meet Padala Soravagangamma; up a stream and across the saddle between ·1620, ·1780 to Pillutla sorava, ·1400; down the said stream to ·1070; thence up the Vedurla sorava to the Cuddapah district boundary. *South.*—The district boundary. *West.*—From a point south of ·1920 on the Cuddapah district boundary, along the ridge through ·1920, ·2050, ·2220, △ 2834 Jativanikuppa, ·2610, △ 2801 Marimanu kuppa, ·2270, ·2390, ·2520 Peddavamikonda, 2150 (*b*), ·2440 Yerukuratisela, ·2480, ·2370, ·2440, △ 2294, △ 2456, Donakonda, ·2210, ·1980, △ 2123 Kanamakonda, ·1920, ·1870, ·1820 to the starting point.
10	10,574	3,818	Othumadugu Felling Series (S.I. sheet Nos. 3 to 7). *North.*—Starting from the junction of Parupulakanama stream and the Divisional boundary, down the stream to the Yenumaleru; the Yenumaleru to the Guralakunta vagu; up the said vagu to Yerukuratisela ·2440. *East.*—From Yerukuratisela ·2440, along the ridge through ·2150 (*b*), ·2520, ·2390, ·2270, △ 2801 Marimanukuppa, ·2610, △ 2834 Jetimanikuppa, ·2730 to the Cuddapah district boundary, Kurudi Banda cheru, Talavennu. *South.*—The Cuddapah district boundary to the Divisional boundary. *West.*—The Divisional boundary to the starting point, Parupulakanama.
11	13,029	2,647	Guvvalapenta Felling Series (S.I. sheets Nos. 5 to 7, 9 and 10). *North.*—Starting from a point on the Divisional boundary south of Galikonda Dadi ·2550, along the Giddalur and Gundlakamma range boundary to the south of △ 1772 in Gundlakamma range; from the said point up the spur and the ridge through ·1962, △ 2020, ·2010; down the spur to the Sandrapodu cart-track; the Sandrapodu cart-track and a foot-path to Yenumal Eru; the Yenumal Eru to meet its tributary north of Amidalapodu; up the tributary and along the ridge through △ 1831 Ragimanipodu konda, to the Pillalaguda konda △ 1891. *East.*—From the Pillalaguda konda △ 1891 along the ridge through ·1820, ·1870 Mottaithoka konda, ·1920, △ 2123 Kanama konda, ·1980, ·2210, ·2456 Donakonda, ·2294, ·2440, ·2370, ·2480, ·2440 Yerukuratisela. *South.*—From Yerukuratisela down the Guvvalakunta vagu to meet the Yenumal Eru; the Yenumal Eru; up the Parupulakanama stream to meet the Divisional boundary east of △ 2390 about 28 chains. *West.*—The Divisional boundary to the starting point.
12	4,914	582	Maduva Felling Series (Veligondas S.I. sheet No. 8). *North.*—Starting from the junction of a foot-path and a stream near Palugubodupaya about 2 furlongs east of ·1210, up the stream and the foot-path to Ramalingaswami and Tekulapenta up to the Nellore district boundary. *East.*—The Nellore district boundary. *South.*—The Cuddapah district boundary. *West.*—The Veligonda South Extension Reserved Forest boundary; the Maduva vagu; a tributary south of ·1390 near Ramalingaswami enclosure; a stream to the saddle west of ·2180; down a stream to the starting point.
			Ganjivaripalli Range.
13	29,503	829	Chinnarutla Felling Series (S.I. sheets Nos. 44, 54, 55 and 62). *North.*—Nil. *East.*—Starting from Nekkanti-penta along the Telugurayanicheruvu bridle path to meet the Telugurayanicheruvu foot-path. *South.*—The foot-path through Telugurayanicheruvu to a point on the Telugurayanicheruvu gudem-Morricheruvu foot-path about one furlong north of ·1730; up the spur leading to ·2000; the ridge ·2000, ·2130, △ 2452 Kavukonda, ·2500, ·2480, ·2500, △ 2597 Jangamiddela konda, ·2430, ·2345, down a streamlet to the Range boundary; the Range boundary to the Divisional boundary. *West.*—The Divisional boundary to the Srisailam-Chinnarutla pilgrim path; the pilgrim path to the Arepenta foot-path; the foot-path to the Chinnarutla-Nekkanti bridle path; the bridle path to the starting point.
14	25,640	2,662	Nekkanti Felling Series (S.I. sheets Nos. 55, 61 and 62). *North.*—Starting from the junction of the Bansadevu kalva and the Nekkanti-Kuntalapadugu penta foot-path near ·1750, down the kalva to join the Kuntalapadugu vagu; down the vagu and the Bandaleru to the Sankaragundam vagu. *East.*—Up the Sankaragundam vagu till it crosses the Guttalachenu-Madapachelima foot-path near 1,500 (*b*); the foot-path to the Gudimetta vagu; down the vagu up to the Madapa chelima subordinates' quarters. *South.*—Up the spur to ·1700; the ridge ·1700, ·2220, △ 2505, ·2540, ·2430, ·2610, ·2450 to the Tumathoka-Gudimetta fire line; the fire line to the Telugurayanicheruvu-Nekkanti bridle path. *West.*—The bridle path to Nekkanti; thence the Nekkanti-Kuntalapadugu penta foot-path to the starting point.

Serial number.	Total area of the series in acres.	Effective bamboo area in acres.	Description of the series boundary.
(1)	(2)	(3)	(4)
			Turimella Range.
15	17,605	7,335	Maddipenta Felling Series (S.I. sheet Nos. 22, 27 and 34). *North.*—Starting from the junction of the Divisional boundary and the Turimella and Dornal common Range boundary, the said common Range boundary to the Chinnamantrala road. *East.*—The said road to the junction of the Devadarikuruva foot-path; the said foot-path; thence up the spur and along the ridge through ·1540, △2289, ·2120, ·2240, ·2230, Ontikonda, △·2240, ·1930 to the junction of the Sim's line and the Komativani cart-track, the Sim's line to a cairn to the north-east of ·1380. *South.*—From the said cairn, up the spur to ·1380; along the saddle and the ridge to the Gundlakamma-Turimella common range boundary; the said common range boundary to meet the Divisional boundary. *West.*—The Divisional boundary to the starting point.
16	24,278	2,919	Turimella Plains Felling Series. Bit 1 (S.I. sheet Nos. 22, 27, 28, 33 and . *North.*—Starting from the junction of the Turimella-Dornal common Range boundary and the Maddipenta-Chinnamantrala road, along the common boundary to meet the Cumbum reserved forest boundary near ·1850. *East.* The reserve boundary to meet the Velagalapaya, then down the Velagalapaya to the reserve boundary again; the reserve boundary to meet the Sim's line; the Sim's line and up a stream to ·2710 on the common range boundary of Turimella and Gundlakamma ranges. *South and west.*—The common range boundary up to a point on the spur east of ·2260; down the spur through ·1380 to the Sim's line; the Sim's line to meet the Komativanibhavi cart-track near ·1270; up the spur to ·1930; the ridge ·2240, ·2230 Ontikonda, ·2240; ·2120, 2289, ·1540; down the spur to the Chinnamantrala Road and the road to the starting point. Bit 2 (S.I. sheet Nos. 18, 19, 21 and 22). *North.*—Starting from ·2710 on the boundary between Turimella and Gundlakamma ranges, through the saddle between △ ·2954, and ·2920, along the ridge ·2750, ·2580, △2607, (Jerrikonda) ·2210. *East.*—The ridge ·2010, △·1914 Urakonda, △1784 and down a spur to the Ralla vagu; up the vagu and up a spur to ·1620 Gunikonda; the ridge ·1710, ·1560. *South.*—The ridge ·1990, ·1940; thence to 1610 on a foot-path; the foot-path for a distance of 15 chains; thence up a spur to △ ·2475; down a spur westwards to meet the common range boundary; the said common range boundary. *West.*—The common range boundary to the starting point.
			Markapur Range.
17	12,262	368	Bommilingam Felling Series (S.I. sheet Nos. 28 and 33). *North.*—Starting from a point near Motamukunta where the common range boundary between Dornal and Markapur Ranges joins the Divisional boundary, along the common range boundary to the Chilakacherla-Marlapenta foot path near ·2630. *East.*—Along the foot-path to the Bommilingam-Rollapenta foot-path near ·2510, the foot-path and another foot-path east of Marlapenta for about a mile to meet the spur from ·2160; up the spur to ·2960; the ridge ·2960, ·2840, ·2950, 2922, ·2910, ·2720, ·2640, ·2500, ·2287; thence down the Kalanuthula sela to the common boundary between Cumbum reserved forest and eastern Nallamalais Block 4 reserved forest. *South.*—The said common boundary. *West.*—The Cumbum reserved forest boundary to the starting point.

405. The following statement compares the proposed Bamboo Working Circle with previous arrangements :—

Name of range.	Previous working plan.			Under the present plan.		
	Felling series.	Area in acres.	Effective area in acres.	Felling series.	Area in acres.	Effective area in acres.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dornal	Peddachama ..	24,416	3,324	Peddachamma ..	24,869	2,382
	Peddamantrala ..	16,954	2,126	Peddamantrala ..	14,444	3,577
	Chinnamantrala ..	15,387	3,704	Chinnamantrala ..	17,640	6,067
	Chilakacherla ..	16,435	4,632	Chilakacherla ..	19,200	927
	Total ..	73,192	13,846		76,153	12,953
Gundlakamma ..	Series I	8,522	Not given.			
	Series II	6,600		Iskagundam * ..	12,994	5,582
	Series III	8,220		Obulesunipenta * ..	18,067	3,274
	Malakondapenta ..	2,242		Malakondapenta ..	13,966	6,021
	Tunnel	2,500		Tunnel	13,970	1,950
	Total ..	28,084	..		58,997	16,827
Giddalur ..	Bodi	20,650	Not given.	Bodi	11,346	1,873
	Othumadugu	9,875		Othumadugu ..	10,574	3,818
	Guvvalapenta ..	10,202		Guvvalapenta ..	13,029	2,647
				Maduva ..	4,914	582
	Total ..	40,727	..		39,863	8,920
Ganjivaripalli ..	Nekkanti	23,000	7,725	Nekkanti ..	25,640	2,662
				Chinnarutla ..	20,503	829
	Total ..	23,000	7,725		55,143	3,491
Turimella ..	Maddipenta	14,849	6,002	Maddipenta ..	17,605	7,335
	Turimella Plains ..	31,424	1,270	Turimella Plains ..	24,278	2,919
	Total ..	46,273	7,272		41,883	10,254
Markapur ..	Markapur range ..	35,193	2,432	Bommilingam ..	12,262	368
	Total ..	35,193	2,432		12,262	368
	Grand total ..	2,46,469		Grand total ..	2,84,301	52,813

* The three old series have been reconstituted into two series.

406. A new series called the Chinnarutla series has been constituted with a view to bringing under working areas which have not been exploited in the past. This series is remotely situated for economical commercial exploitation but it should be possible to collect walking and goading sticks by Chenchu labour for sale to pilgrims at recognized mettas and also for supply of bamboos to the Srisailam temple authorities for the construction of huts and sheds for the Sivarathri festival. The Srisailam pilgrim path passes through this series.

407. The old Markapur series has been reconstituted into the Bommilingam series. The Markapur series has been inoperative in the past and with a view to providing the villages of Gannepalli, Bommilingam, Magatur, etc., with a legitimate source of obtaining their annual requirements of bamboos, the bamboo areas overlooking these villages have been constituted into the Bommilingam series.

408. The coupes in felling series I, II and III of Gundlakamma Range under the previous working plan were invariably clubbed together and sold in the past. These three series have now been suitably reconstituted into two.

409. A new series called the Maduva series has been constituted in the Veligonda forests bordering on Cuddapah district.

410. *Character of the vegetation.*—The character of the vegetation in the bamboo type has been described under Chapter II of Part I. The density of the bamboo crop varies from a pure stand of bamboo to a few clumps mixed with tree species. Along the backbone of the Nallamalais and on the plateau of Iskagundam and along interior valleys and ridges *Dendracalamus strictus* occurs in pure stands almost to the exclusion of tree species. The clumps are on the whole healthy and free from suppression but congestion in clumps is noticeable in remote areas which have remained unexploited.

SECTION 2.—ANALYSIS OF THE CROP.

411. *Stockmapping.*—The bamboo areas of the division have been stockmapped by ocular estimate by the working plan staff and are shown on the stockmaps. The two species have been distinctively shown and two density classes, viz., dense and sparse, have been distinguished. Dense areas are those that contain more than 50 clumps to an acre and sparse less than 50. A number of sample plots both in dense and sparse areas were laid out and enumerated by the working plan staff. The results of the enumeration are embodied in Chapter VI of Part I.

SECTION 3.—METHOD OF TREATMENT.

412. *Past researches.*—Past research on the methods of bamboo exploitation indicates that :—

(1) A clump should be encouraged to grow in the direction in which it has a tendency to develop which can be determined by observing where the youngest culms grow.
(2) Exploitation over the entire periphery of the clump should be avoided.
(3) Too large clearances inside a clump should not be made. Culms left behind should be as evenly distributed as possible.
(4) Cutting should be restricted to culms more than a year old.
(5) Some old culms should be left behind, both as support to the new culms and to maintain the rhizomes in a state of vigour.
(6) Annual cutting gradually diminishes the size of the clump. A felling cycle of three years produces the maximum yield.
(7) Clear felling definitely ruins the rhizomes in a short time.
(8) Established clumps give a higher yield when grown in the open but moderate cover enhances the quality of the culms at the expense of quantity.
(9) Height of cutting is of no special silvicultural importance but cutting at a height above one foot from ground level is desirable. Exhaustive experiments on the best methods of working bamboos have been recently initiated by the Central Silviculturist, Dehra Dun; the results will not, however, be available for a few more years.

413. *System of management.*—The system of management may be defined as selection thinning of bamboo clumps on an area basis.

414. *Felling cycle.*—The fixing of a felling cycle for bamboo working depends on the age of maturity of a culm which is one year and the age at which the culm definitely begins to deteriorate which is five to six years. The felling cycle may, therefore, be between one and five years. The determination of a suitable felling cycle depends further on—

(*a*) intensity of working,
(*b*) agency of exploitation, and
(*c*) use to which the bamboo is put.

Where compact areas are involved annual felling cycle may be adopted, but it is likely to diminish gradually the size of the clump. Where the working of large areas is involved, a long felling cycle is indicated. A short felling cycle may be adopted in the case of departmental exploitation, but where contract agency is employed a long felling cycle is desirable so as to rectify the severity of the fellings to which the clumps may be subjected under contract working. A short felling cycle is indicated where the bamboos are utilized for fine basket and mat work, but where it is used for a variety of purposes including basket making and house construction a medium felling cycle is indicated. The conditions prevailing in this division are—

(*a*) Extensive areas have to be worked.

(*b*) Exploitation by contractors is the normal practice.

(*c*) Bamboos are used for a variety of purposes.

A three-year felling cycle is, therefore, considered suitable and it will be adopted.

415. *Division into coupes.*—Each felling series is divided into three coupes containing nearly equal effective bamboo area. The felling series and their division into coupes are shown on the stockmaps, Survey of India sheets 4 inches to a mile.

416. *Number of culms left behind.*—The proper working of bamboo areas demands the retention of some of the mature culms in addition to the new ones. Neither so much should be cut as would cause a set back to the clump nor so little as to leave culms which would die before the next felling. Recent working plans have prescribed the number of culms to be left behind in each exploited clump as six. It is not known how this fixed number was arrived at. As clumps are of varying capacity the retention of only six mature culms in a heavy clump may result in over-exploitation, while in a light one in under-exploitation. In practice, the coolies content themselves with leaving a group of six mature culms in one corner of the clump in spite of our felling rules that they should be left evenly distributed over the clump. It is recognized that no new culms, i.e., culms less than one year old should be felled, but certain ‘ medaras ’ persist in illicitly felling a certain number of immature culms for purposes of fine splits. Till definite conclusions are arrived at from the experiments undertaken by the Central Silviculturist regarding bamboo working, a minimum of six mature culms evenly distributed over the entire clump and all new culms should be left behind in any clump exploited.

417. *Tending.*—The tending of bamboo clumps with a view to removing congestion by opening up the clump, removal of malformed and dead bamboos and freeing the clumps from climbers and suppression has not received the attention it deserves in the past, with the result the productivity of the clumps is bound to be retarded. One objection against tending operations has been that the operation would be expensive and that contract enterprise would resent imposition of restrictions and conditions. Contract enterprise replaced departmental working about ten years back and admittedly the imposition of avoidable restrictions and conditions would in the initial stages of the transition have resulted in discouraging contract enterprise. The system of contract working has advanced so much and is at present in such an organized state that the present time is considered propitious to institute tending operations as a condition of the contract. A commencement may, however, be made with one series to start with and thereafter it may be gradually extended to the other series if the results are found satisfactory.

418. *General management.*—The management of bamboo areas has not been undertaken seriously in the past in spite of the fact that the revenue derived from this source alone amounts to nearly a sixth of the total revenue from the division. When a coupe is sold at a satisfactory price, which is usually reckoned slightly higher than the average realization of the last three years, the management considers that everything has been done; but, on the other hand, the trouble begins only when a coupe is sold. It is imperative that the silvicultural working of bamboo should receive the same amount of attention as timber working, as bamboo is the poor man’s timber and is put to a variety of uses, and nature has been so bountiful in its distribution and regeneration that it would be calamitous if the management were to neglect its silvicultural exploitation. The revenue derived from bamboo working is *nett* as the species regenerates itself freely and little artificial help is required. Every endeavour should therefore be made to work the bamboo areas on scientific lines in accordance with the rules prescribed for exploitation and tending so that the existing resources may serve to the maximum benefit of the people in perpetuity. Much emphasis is laid on this point as the Nallamalais form the nearest sources of supply of bamboo to the neighbouring districts of Bellary, Anantapur and Guntur. Exploitation in the past has never been up to the possibility of the forest although the more accessible areas have been heavily and sometimes ruthlessly exploited while remoter ones have been left untouched. This is partly due to lack of communications and this problem has been tackled to some extent under the “ Miscellaneous Regulations.” Provided exploitation up to the possibility of the forest is made on silvicultural lines the revenue from bamboo is capable of considerable augmentation.

419. *Agency of fellings.*—Ordinarily, fellings will be made through the agency of contractors. The District Forest Officer may in the event of a contractor's bid being low or for other valid reasons such as employment of Chenchu labour, undertake exploitation departmentally. Irrespective of the agency of fellings, wherever Chenchus are available, they will be employed on exploitation. If, however, for any valid reasons, outside labour has to be employed in places where Chenchu labour exists, the contractor should obtain the previous written sanction of the District Forest Officer. Should contract enterprise be not forthcoming for the purchase of the Bommilingam, Papinenipalli or Maduva series, permits may be issued departmentally at seigniorage rates to the villagers for their *bona fide* domestic requirements for the collection of bamboos from the coupe due for exploitation in that year. The staff should specially see that the felling rules are observed. The Chinnarutla series will be worked departmentally by Chenchu labour for providing goading and walking sticks to the pilgrims who attend the Sivarathri festival and also for supplying bamboos to the Srisailam temple authorities before the festival. The sticks will be stored at the mettas and sold at fixed rates. A monogram of the Srisailam God may be stamped on the sticks to arouse religious sentiment. The Nekkanti Bamboo Series is at present being worked departmentally. When the Guttalachenu road is set in order in the near future it should be possible to work this series on contract.

420. *Period of lease.*—Ordinarily the period of lease will be one year from the 1st of April. The sale of bamboo coupes will be held in February and the lessees should be put in possession of the coupes on the 1st of April so that they may undertake exploitation in the months of April and May before the rains set in when bamboo working is generally slack.

421. *General.*—A large demand for the solid variety of *Dendrocalamus strictus* exists in the Guntur and Nellore districts for use as tobacco hangers. Another possibility of utilizing this kind of bamboo will be for umbrella handles. The Nekkanti and Chinnarutla series would become valuable if and when an enterprise in the making of umbrella handles out of bamboo comes up.

SECTION 4.—METHOD OF EXECUTING THE FELLINGS.

422. *Exploitation.*—Commencing from the year 1940, annually one coupe in each series in the serial order given under the " Tabular Statement of Fellings " below will be exploited. If the coupe due for exploitation in any year cannot be sold or exploited, full reasons for the non-saleability of the coupe in that year should be recorded in the Control Journal and the next coupe will be exploited in the following year. The practice of clubbing together all the coupes in a range and selling them to one contractor is to be deprecated even though such a procedure may be productive of slightly enhanced revenue. By doing so small contractors are automatically eliminated which is undesirable. The author does not believe in one affluent contractor monopolising the entire trade in bamboo in a division or a range, as it will result in the contractor trying to maintain an inflated market rate by reducing the quantity exploited and thereby leaving much of the areas unexploited. It often happens that one influential contractor takes all the coupes in a range and rests content with working only one conveniently situated coupe to maintain the local market and leaving the rest of the coupes unworked. Every coupe should therefore be put up for sale individually. The demarcation of bamboo coupes is unnecessary as well defined natural features have been selected for the coupe and series boundaries.

423. *Felling rules.*—The following felling rules will be observed in bamboo working. The necessity should be impressed on the territorial staff for seeing that the rules are adhered to by the felling coolies during their periodical inspections, and inspecting officers should make a point of explaining to the staff and the coolies the value of the rules and seeing that they are carried out :—

(*a*) No new culms may be felled. ' New culms ' are defined as culms less than one year old. New culms are recognized by the sheaths and the bloom.

(*b*) In each exploited clump a minimum of six mature culms, i.e., culms more than one year old, will be left behind evenly distributed over the clump. All the remaining mature culms may be felled. Culms left behind should be the youngest and the healthiest of mature culms.

(*c*) Fellings will be made on the side directly opposite to that where the largest number of new culms are found. As this condition may be difficult to enforce in contract working, it will be observed in all departmentally worked coupes.

(*d*) Cutting should be as low as possible but never below one foot from ground level and preferably above a node.

(*e*) The removal of culms with the rhizomes is strictly prohibited.

(*f*) In flowered areas culms should be cut only after the seeding is over.

(*g*) Clumps should be tended at the time of felling by opening up the clump, by removing dead bamboos, cutting diseased and malformed culms, removing climbers, etc. The introduction of this condition in all the coupes at once is likely to be resented; it is therefore prescribed that a start may be made in one conveniently situated series and thereafter the condition may gradually be introduced in the other series.

In all departmentally worked series the felling rules should be fully and strictly followed, so that the contractor's coolies can learn what is intended. Often they do not understand at all and sometimes they have never even seen or heard the felling rules. Emphasis is laid on the necessity for the District Forest Officer and the Range Officers to ensure that all coolies who work bamboo do, at any rate, understand what is required of them.

SECTION 5.—TABULAR STATEMENT OF FELLINGS.

424. *Statement.*—The areas and a description of the boundaries of the coupes in each felling series as well as the order in which the coupes are to be exploited are given in the following statement. The coupes are shown on the stock maps.

Serial order in which the coupes are to be worked from the year 1940.

Series.	Order of coupes.	Series.	Order of coupes.
1 Peddachama	I, II, III	10 Othumadugu	II, III, I
2 Peddamantrala	I, II, III	11 Guvvalapenta	II, III, I
3 Chinnamantrala	I, II, III	12 Maduva	I, II, III
4 Chilakacherla	I, II, III	13 Chinnarutla	I, II, III
5 Iskagundam	I, II, III	14 Nekkanti	I, II, III
6 Obulesunipenta	III, I, II	15 Maddipenta	I, II, III
7 Malakondapenta	III, I, II	16 Turimella plains	I, II, III
8 Tunnel	III, I, II	17 Bommilingam	I, II, III
9 Bodi	II, III, I		

Coupe number. (1)	Total area in acres. (2)	Effective bamboo area in acres. (3)	Boundary description. (4)
			DORNAL RANGE.
			1. *Peddachama Felling Series.*
I	6,747	623	*North.*—Starting from the north-west corner of the range, along the common boundary between Dornal and Ganjivaripalli ranges to the Maddigundam vagu. *East.*—Down the vagu to the Nippulagundam vagu. *South.*—Up the Nippulagundam vagu and Yerragundam vagu to the Divisional boundary near 2330. *West.*—The Divisional boundary to the starting point.
II	10,113	911	*North.*—Starting from the point where the common boundary between Dornal and Ganjivaripalli ranges meets the Maddigundam vagu, eastwards along the common range boundary to the Telugurayanicheruvu-Chintala bridle path. *East.*—The said bridle path to the Chintala-Pedda Bommalapuram cart-track; the cart-track to a streamlet west of ·1100, down the streamlet to the Ralla vagu. *South.*—Up the Ralla vagu, the Pilligundla vagu and the Podavelenu kalva to the source of the last one; down another streamlet to the Poiyalipaya; up the paya (part) and a streamlet to meet the Cherlopalli slope fire line near the abandoned Podavelenu penta, westwards along the fire line to the Peddachama-Yeguvacherlopalli footpath near ·1960. *West.*—The footpath to the Peddachama-Dornal road; the road to the Peddachama-Thummalabailu bridle path; the bridle path to the Yerragundam vagu; down the vagu to a point where the Maddigundam vagu joins it; up the Maddigundam vagu to the starting point.
III	8,009	848	*North.*—Starting from the point where the Divisional boundary meets the Yerragundam vagu near ·2330, down the vagu to the Thummalabailu-Peddachama bridle path. *East.*—The said bridle path to the Dornal-Peddachama road; the road to meet the Peddachama-Yeguvacherlopalli footpath; the foot-path and the Chintala-Yeguvacherlopalli bridle path to the spur east of △ 2372. *South.*—Up the spur to △ 2372; the ridge △ 2372, ·2460, ·2420, ·2400, ·2510, ·2480, △ 2507; down a streamlet to the Sama kalva; along the Pullalagutla-Nallagunta-Kudupa fire line to meet the Divisional boundary. *West.*—The Divisional boundary to the starting point.
			2. *Peddamantrala Felling Series.*
I	2,260	1,211	*North.*—Starting from the junction of the Divisional boundary and the Pullagutla-Nallagunta-Kudupa fire line, along the fire line to the Peddachama-Nallamadugu penta road (near the spur from ·2160). *East.*—Up the spur to ·2160; the ridge ·2160, Kudupa konda, ·2720, △ 2673, ·2480 b, ·2450; down the spur to meet the Rollapenta ghat road. *South.*—The said road to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
II	2,954	1,390	*North.*—Starting from the junction of the Pullalagutla-Nallagunta-Kudupa fire line with the Nallamadugupenta-Peddachama road, eastwards along the fire line to a streamlet from △ 2507. *East.*—Up the streamlet to △ 2507.

Coupe number.	Total area in acres.	Effective bamboo area in acres.	Boundary description.
(1)	(2)	(3)	(4)
			DORNAL RANGE—*cont.*
			2. *Peddamantrala Felling Series*—cont.
			South.—The ridge △ 2507, ·2520, ·2550, ·2560, ·2690, ·2820, △ 2791, Pedda konda, △2773, ·2330, △2206 ; down the spur to meet the Rollapenta ghat road (near the 62nd mile stone) ; the road to meet the spur from ·2450. *West.*—Up the spur to ·2450 ; the ridge ·2450, ·2480 b, △2673, ·2720, Kudupa-konda, ·2160 ; down the spur to the starting point.
III	9,230	976	*North.*—Starting from the 62nd mile stone on the Rollapenta ghat road up the spur to △2206 ; the ridge △2206, ·2330, △2773, △2791, Pedda-konda, ·2820, ·2690, ·2560, ·2550, ·2520, ·2507, ·2480, ·2510, ·2400, ·2420, ·2460, △2372 ; down the spur to meet the Peddachama-Yeguvacherlopalli footpath. *East.*—The said footpath to the reserve boundary ; the reserve boundary to the Lingamraju vagu ; an arbitrary line about 2 chains parallel to the vagu to the Rolla penta ghat road ; the road up to the 72nd mile 3rd furlong (near △903) ; up the spur to ·1310 ; the ridge ·1310, ·1450, ·1390, ·1380, ·1510, ·1720, Narasimhaswami temple, ·1720 to the Eastern Nallamalais Block 6 (A.I.) R.F. boundary. *South.*—Along the boundary lines of Eastern Nallamalais Block 6 (A.I.) R.F. Markapur and Cumbum reserves, to the footpath west of ·1130 ; the said footpath and the Peddamantralagudem-Nallagunta footpath to the ridge from ·1860 ; the ridge ·1860, △1956, ·1890, ·2000 Paluguralla Bodu, △2043, ·2130, ·2090 Yeddula thoka, ·2300, ·2250, to the Narlapaya-Nagayyakunta fire line. *West.*—The said fire line through △ 2483 Peddamantikonda to the Rolla-penta ghat road ; along the road to the starting point.
			3. *Chinnamantrala Felling Series.*
I	11,038	1,854	*North.*—Starting from the junction of the Siddapalle-Chinnamantrala foot-path with the Divisional boundary, eastwards along the footpath to the Nallamadugupenta-Chinnamantrala road ; the road till it joins the Mantrala vagu ; down the vagu to the Narlapaya-Nagayyakunta fire line. *East.*—The fire line up to ·1700 b near Chintakayalakuruva ; a spur leading to ·2050 ; the ridge ·2050, ·1840, ·2100, Narlapayagattu, ·1860, ·1730, ·1890 to the common boundary between Turimella and Dornal ranges. *South.*—The common range boundary to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
II	4,081	1,862	*North.*—Starting from a point on the Rollapenta ghat road where the spur from ·2100 meets the road near the 61st mile 3rd furlong, eastwards along the road to meet the Narlapaya-Nagayyakunta fire line ; the fire line to meet the Nallagunta-Chinnamantrala road. *East.*—Southwards again along the fire line to the Mantrala vagu. *South.*—Up the vagu to the Chinnamantrala ; the Chinnamantrala-Nallamadugu penta road ; the footpath to Siddepalli to the spur near Kortikanama. *West.*—Up the spur to ·2410, the ridge ·2410, ·2530 b, △ 2604 Madduleni-konda, ·2470, ·2340, ·2100 ; down the spur to the starting point.
III	2,521	2,351	*North.*—Starting from the point where the Rollapenta ghat road and the Divisional boundary meet, the boundary eastwards along the road to the spur from ·2100 near the 61st mile 3rd furlong. *East.*—Up the spur leading to ·2100 ; the ridge ·2100, ·2340, ·2470, ·2604 Madduleni konda, ·2530 b, ·2410, down the spur to a point on the Chinna mantrala-Siddapalli footpath near Kortikanama. *South.*—The footpath to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
			4. *Chilakacherla Felling Series.*
I	1,538	303	*North.*—Starting from a point on the Narlapaya-Nagayyakunta fire line where it crosses the ridge ·1550, and ·1720, along the ridge ·1720, △1793, ·1630, ·1830, △1800, Kurapenta konda, ·1730, △ 1765, up the boundary line of Eastern Nallamalais Block 6 C.R.F., the boundary line to the Thigaleru. *East.*—Up the river Thigaleru to its junction with the Narlapaya vagu. *South.*—Up the Kurapenta vagu to the Narlapaya-Nagayyakunta fire line. *West.*—The fire line to the starting point.
II	8,717	332	*North.*—Starting from the point where the Narlapaya-Nagayyakunta fire line crosses the Kurapenta vagu, down the vagu till the Narlapaya vagu joins it. *East.*—Up the Narlapaya vagu and the Motam sela to the range boundary ; the range boundary to the trijunction of Turimella, Dornal and Markapur ranges near Motamu kunta. *South.*—The common boundary between Dornal and Turimella ranges to the ridge south of ·1890. *West.*—The ridge ·1890, ·1730, ·1860, Narlapayagattu, ·2100, ·1840, ·2050 ; down a spur to ·1700 b on the Narlapaya-Nagayyakunta fire line near Chintakayala kuruva ; the fire line to the starting point.
III	8,945	292	*North.*—Starting from the point where the boundary line of Eastern Nalla-malais Block 6 C.R.F. crosses the Thigaleru, along the R.F. boundary to ·1884 Bollimidi kuruva ; thence along the boundary of Cumbum R.F. to the Tummagundam sela. *East.*—Up the sela to meet the common boundary between Dornal and Markapur ranges. *South.*—The common range boundary to the Motam sela. *West.*—Down the sela, the Narlapaya vagu and the Thigaleru to the starting point.

GUNDLAKAMMA RANGE.

5. Iskagundam Felling Series.

Coupe number. (1)	Total area in acres. (2)	Effective bamboo area in acres. (3)	Boundary description. (4)
I	4,499	1,834	*North.*—From the junction of the Divisional boundary and the North catchment area fire line, along the said fire line to the Maddipenta-Obulesunipenta bridle-path. *East.*—The Maddipenta-Obulesunipenta bridle-path and the Obulesunipenta-Iskagundam road. *South.*—The Iskagundam-Gundlabrahmeswaram road till it meets the Deva vagu ; up the spur to ·2700 on the Divisional boundary. *West.*—The Divisional boundary to the starting point.
II	4,832	1,816	*North.*—Starting on the Divisional boundary at ·2700, down the spur to the Gundlabrahmeswaram-Iskagundam road where it crosses the Deva vagu ; thence along the said road. *East.*—The Iskagundam-Malakondapenta road to the South catchment area fire line. *South.*—The said fire line to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
III	3,663	1,932	*North.*—Starting from the junction of the Divisional boundary and the South catchment area fire line, the said fire line to the Iskagundam-Malakondapenta road. *East.*—The said road to the South outer boundary fire line. *South.*—The said fire line to the Divisional boundary. *West.*—The Divisional boundary to the starting point.

6. Obulesunipenta Felling Series.

Coupe number. (1)	Total area in acres. (2)	Effective bamboo area in acres. (3)	Boundary description. (4)
III	5,507	1,102	*North.*—Starting from the junction of the Iskagundam-Malakondapenta road and the South catchment area fire line, the said fire line to the Vonti Veeranapenta fire line. *East.*—The South catchment area fire line to the Gundlakamma-Turimella common range boundary. *South.*—The said common range boundary to the East outer line ; the said line to the Malakondapenta-Iskagundam road. *West.*—The said road to the starting point.
I	4,568	1,082	*North.*—Starting from the junction of the Obulesunipenta-Maddipenta bridle-path and the North catchment area fire line, the said line. *East.*—The said line till it meets the Urinarava fire line. *South.*—The said fire line to the Pulichudu stream ; the said stream to the Ullithegala vagu ; the said vagu to the Gundlakamma river ; the said river to the Iskagundam-Obulesunipenta road. *West.*—The Iskagundam-Obulesunipenta road and the Maddipenta-Obulesunipenta bridle-path to the starting point.
II	7,992	1,090	*North.*—From the junction of the Obulesunipenta-Iskagundam road and the Gundlakamma river ; the said river to the Ullithegala vagu ; up the said vagu and the Pulichudu stream to the Urinarava fire line ; the said fire line to the North catchment area fire line. *East.*—The North catchment area fire line to the Gundlakamma-Turimella common range boundary ; the said common boundary to the Medijeri fire line. *South.*—The said fire line to the Gundlakamma river ; the said river to the Vontiveruni penta fire line ; the said fire line ; the South catchment area fire line to the Malakondapenta-Iskagundam road. *West.*—The said road to the starting point.

7. Malakondapenta Felling Series.

Coupe number. (1)	Total area in acres. (2)	Effective bamboo area in acres. (3)	Boundary description. (4)
III	2,476	1,924	*North and east.*—Starting from the junction of the Divisional boundary and the South outer fire line, the said line till it meets the Guvvalapenta fire line. *South.*—Up the spur to ·2650 ; thence along the ridge ·2650, ·2510, to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
I	3,986	2,154	*North.*—Starting from a point on the Divisional boundary about half a mile to the north of △2744, along the ridge ·2510, ·2650 down to the junction of the Guvalapenta and South outer fire lines. *East.*—The South outer fire line to the Iskagundam-Malakondapenta road ; the said road to the Ragimanipenta fire line. *South.*—The Ragimanipenta fire line ; up a spur to ·2030 ; thence the ridge ·2030, △2244, △2390, ·2130, ·2160, ·2420 ; down the spur to meet the Divisional boundary to the north of ·2260. *West.*—The Divisional boundary to the starting point.
II	7,504	1,943	*North.*—Starting on a ridge on the Divisional boundary to the north of ·2260, up the spur ·2420 ; the ridge ·2420, ·2130, △2390, △2244, ·2030 ; down a spur to the Ragimanipenta fire line ; the said fire line to the Iskagundam-Malakondapenta road ; the said road and the East outer fire line to meet the Turimella range boundary. *East.*—The Gundlakamma-Turimella common range boundary to the Cheppalakunta kalvai. *South.*—Up the Cheppalakunta kalvai and down the Velugula sela streamlet to the Dadigundla vagu ; up the said vagu and a streamlet to the south of ·1700 to meet the ridge south of △2366 on the Divisional boundary. *West.*—The Divisional boundary to the starting point.

Coupe number.	Total area in acres.	Effective bamboo area in acres.	Boundary description.
(1)	(2)	(3)	(4)
			GUNDLAKAMMA RANGE—*cont.*
			8. *Tunnel Felling Series.*
III	6,835	696	*North.*—Starting from △2403 on the Divisional boundary down the spur to ·1760; up the spur and along the ridge through ·2040, △1988, △1871, △1756, to the South Railway guide line north of Jangamkunta; the said line to meet the Nandikanama ghat road; the said ghat road and the North Railway guide line to the Gundlakamma-Giddalur common range boundary. *East.*—The said common boundary to the Gaimetaka kalvai and its tributary; up the said tributary to △1567; along the ridge to meet the stream near △1859; down the said stream to meet the Gundlakamma-Giddalur common range boundary. *South.*—The said common Range boundary to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
I	4,436	647	*North.*—Starting from a point south of △2366 on the Divisional boundary, down the streamlet south of ·1700; down the Dadigundla vagu; up the Velugula sela and down the Cheppalakunda kalvai to the Gundlakamma-Turimella common range boundary. *East.*—The said common Range boundary to the Sagal Eru; down the said Eru to meet the tributary to the south of ·1170. *South.*—Up the said tributary to the Mokalakuruva fire line; the said fire line; the North Railway guide line and up the streamlet to ·1900 and thence along the ridge to ·1980 near the Divisional boundary. *West.*—The Divisional boundary to the starting point.
II	2,699	607	*North.*—Starting from the Divisional boundary near ·1980, along the ridge to ·1900; down the streamlet to the North Railway guide line; the said guide line and the Mokalakuruva line to the west of ·1360. *East.*—Up the spur and along the ridge through ·1920, ·1860, △1853, down to the Nandikanama ghat road; the said road and the South Railway guide line to Jangamkunta. *South.*—From Jangamkunta up the spur and along the ridge through △1756, △1871, △1988, △2040, ·1760 to △2403 on the Divisional boundary. *West.* The Divisional boundary to the starting point.
			GIDDALUR RANGE.
			9. *Bodi Felling Series.*
II	2,941	665	*North.*—Starting from a point on the Medaravani Chelama vagu between △2225 and ·2230, eastwards down the said vagu. *East.*—Up the spur and along the ridge through ·1800 Chelamakonda, ·1660, to the Tadutla vagu; the said vagu to the Sim's line; the Sim's line to the Chikkumaddi vagu. *South.*—Up the said vagu to the Yerukurati sela ·2440. *West.*—From the said point to △2498 Devarakuppa; through the saddle and along the ridge △2498 to the starting point.
III	3,705	553	*North.*—Starting from the footpath about 8 chains south of Pillala guda konda △1891, along the footpath eastwards to the Sim's line. *East.*—The Sim's line to the Papiledu sela; up the sela and the saddle to the south of ·1390; up the spur to ·1570, along the ridge to ·1730; along a foot-path about 45 chains, then eastwards to ·1810, ·1710; down the stream to the Medarvani chelama vagu. *South.*—Up the vagu to a point between △2225, ·2230, along the ridge through △2496, △2498. Devarkuppa to the Yerukurati sela ·2440. *West.*—From the Yerukurati sela ·2440, along the ridge ·2480, ·2370, ·2440, △2294, △2456 Donakonda, ·2210 Polaya konda, ·1980, △2123 Kanama konda, ·1920, ·1870 Mottathoka konda, ·1820 to the starting point.
I	4,700	655	*North.*—Starting from ·2440 Yerukurati sela down the Chikkumaddi vagu to the Sim's line. *East.*—Along the Sim's line to the Jangam Bhavi footpath, the said footpath; thence up the spur and along the ridge through ·1580, ·1730, to the Bodivagu; thence up the stream and along the saddle and down another stream to Padala sorava gangamma; up the stream across the saddle between ·1620, ·1780, to Pilutla sorava ·1400, down the said stream to ·1070; thence up the Vadurala sorava to the Cuddapah District boundary. *South.*—The said District boundary. *West.*—From a point south of ·1920 on the said district boundary along the ridge through ·2050, ·2220, △2834, ·2610, △2801, ·2270, ·2390, ·2520, △2150 b, to the starting point.
			10. *Othumadugu Felling Series.*
II	3,290	1,221	*North.*—Starting from a point on the Range boundary down the Sudagundla paya to the Yenumuleru; the Yenumuleru and the Namalagavi stream to Jativani kuppa △2834. *East.*—From Jativanukuppa △2834, ridge ·2730 to the Cuddapah District boundary, Kurudibanda chenu, Talavanu. *South.*—The District boundary. *West.*—The Divisional boundary to the starting point.
III	3,390	1,360	*North.*—Starting from the Parupala kanama stream on the Divisional and Sirvel Range boundary, down the stream to the Yenumuleru; the Yenumuleru to the Guralakunta vagu; up the said vagu to the Yerukurati sela ·2440. *East.*—From Yerukurati sela ·2440, along the ridge through ·2150 b, ·2520 and ·2390.

Coupe number. (1)	Total area in acres. (2)	Effective bamboo area in acres. (3)	Boundary description. (4)
			GIDDALUR RANGE—*cont.*
			10. *Othumadugu Felling Series*—cont.
			South.—From ·2390 down the spur about 35 chains; along the saddle westwards to ·2310; the said point down the spur to the Dadigundla vagu; the said vagu to the Yenumuleru; the said eru to meet its tributary about 30 chains; up the tributary to the Divisional boundary to the east of ·2430. *West.*—The Divisional boundary to the starting point.
I	3,894	1,237	*North.*—Starting from a point on the Divisional boundary to the east of ·2430, down the valley to join the stream to the Yenumuleru; the Yenumuleru about 25 chains to the Dadigundla vagu; up the vagu to a point on the saddle south of ·2310; up the spur to the said point; eastwards to a point on the spur; thence southwards to ·2390 about 25 chains. *East.*—From ·2390 along the ridge ·2270, △2801 Marimanu kuppa, ·2610, △2834 Jativani kuppa. *South.*—Down the Namalagavi stream to the Yenumuleru; the Yenumuleru to ·1600 b; then up the Sudagundala paya to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
			11. *Guvvalapenta Felling Series.*
II	4,184	768	*North.*—Starting from a point on the Divisional boundary about 20 chains to the north-east of ·2470, along the spur and the saddle of Yedurlakonda to Jayaramireddi kota footpath; the said footpath to the Dokkalagundam vagu; the said vagu to the Yenumuleru and its tributary and up the tributary to △2123 Kanamakonda. *East.*—From △2123 Kanamakonda along the ridge through ·1980, ·2210 to △2456 Donakonda. *South.*—Down the stream to the Yenumuleru; the Yenumuleru to Mamidigundam; up its tributary to meet the Divisional boundary about 15 chains east of △2568. *West.*—The Divisional boundary to the starting point.
III	5,920	1,062	*North.*—Starting from a point on the Divisional boundary south of Galikonda Dadi ·2550, along the Giddalur and Gundlakamma common range boundary to a point to the south of ·1772 in Gundlakamma range; from the said point up the spur and the ridge through ·1962 ·2020, ·2010, down the spur to meet the Sandrapodu cart-track; the Sandrapodu cart-track to a footpath and the Yenumuleru to the north of Amidalapodu; from the said point up the stream and along the ridge through ·1831 Ragimanipodukonda to the Pillalagudakonda to △1891. *East.*—From the Pillalagudakonda △1891, along the ridge through ·1820 Mottaithokakonda, ·1870, ·1920, ·2123 Kanama konda. *South.*—From Kanamakonda ·2123, down the stream to the Yenumuleru; the Yenumuleru; up the Dokkalagundam vagu to the Jayaramireddi-kota footpath; the footpath to a point on the Yedurlakonda spur; along the spur to Yedurlakonda to the Sirvel Range boundary between the saddle to the north-east of ·2470. *West.*—The Divisional boundary to the starting point.
I	2,925	817	*North.*—Starting from a point on the Sirvel Range boundary to the east of △2568, down the stream to meet the Yenumuleru near Mamidigundam; the Yenumuleru and up its tributary to meet △2456 Donakonda. *East.*—From Donakonda △2456, along the ridge through △2294, ·2440, ·2370, ·2480 to Yerukurati sela ·2440. *South.*—From Yerukurati sela down the stream westwards to the Yenumuleru; the Yenumuleru and up the Parupala kanama stream to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
			12. *Maduva Felling Series.*
I	1,194	180	*North.*—Starting from the junction of a footpath and a stream near Palugu bodu paya east of ·1210, about two furlongs; up the stream and a footpath to Ramalingaswami and Tekulapenta up to the Nellore District boundary. *East and south.*—The Nellore District boundary to a point on the ridge south of ·2250; along the ridge through ·1880, ·1810, to the stream and footpath junction; down the Maduva vagu to meet its tributary in the Ramalingaswami enclosure near ·1390. *West.*—Up the said tributary; through a saddle between ·2270 and ·2180 and down a stream to the starting point.
II	1,170	199	*North.*—From a point on the ridge south of ·2250 on the Nellore District boundary to the said District boundary. *East.*—The Nellore District boundary to meet a small streamlet of the Chenchubodu sela close to ·1930. *South.*—Down the Chenchubodu sela to meet the junction of Maduva vagu and a footpath. *West.*—Up the Maduva vagu to stream junction; up the ridge through ·1810, ·1880, to the starting point.
III	2,550	203	*North.*—Starting from the Reserve Forest boundary near Subbanna Bhavi and Maduva vagu, up the said vagu to the junction of a footpath and a stream to join the Chenchubodu sela; up the sela to the Nellore District boundary close to ·1930. *East.*—The Nellore District boundary. *South.*—The Cuddapah District boundary. *West.*—The Reserve Forest boundary to the starting point.

Coupe. number. (1)	Total area in acres. (2)	Effective bamboo area in acres. (3)	Boundary description. (4)
			GANJIVARIPALLI RANGE.
			13. *Chinnarutla Felling Series.*
I	7,493	270	*North.*—Starting from the junction of the Srisailam-Chinnarutla pilgrim path and the Divisional boundary, along the pilgrim path to the Arepenta footpath; the footpath to the Nekkanti bridle-path; the bridle-path to the Kamashamma vagu. *East.*—Up the vagu and the Tarripothalabanda vagu to the latter's source; down a streamlet to the Telugurayanicheruvu Chinnarutla pilgrim path. *South.*—The pilgrim path till it crosses the Peddarutla vagu; the vagu; the Nekkanti-Chinnarutla bridle-path to Chinnarutla; the Chinnarutla-Chinnagulabanda penta footpath; the footpath to the range boundary; the range boundary to the Divisional boundary. *West.*—The Divisional boundary to the starting point.
II	10,484	331	*North.*—Starting from the junction of the Kamashamma vagu and the Chinnarutla-Nekkanti bridle-path along the bridle-path to Nekkanti penta. *East.*—The Nekkantipenta-Telugurayanicheruvu bridle-path to the Gudimetta Morricheruvu footpath. *South.*—The said footpath to Morricheruvu; thence along the Morricheruvu-Chinnarutla path to the Emukaleru vagu near ·2200. *West.*—Up the stream to its source; down the Jarripothula banda vagu and Kamashamma vagu to the starting point.
III	11,526	228	*North.*—Starting from the junction of the Peddarutla penta vagu and the Nekkanti -Chinnarutla bridle-path, up the vagu to the Chinnarutla-Morricheruvu path; the path to the Nekkanti-Telugurayanicheruvu bridle-path at Gudimetta. *East.*—The-bridle path to the Telugurayanicheruvu penta footpath. *South.*—The footpath through the cheruvu to a point on the Telugurayanicheruvu gudem-Morricheruvu footpath about one furlong north of ·1730; up a spur leading to ·2000; the ridge ·2000, ·2130, △2452, ·2500, ·2480, ·2500, △2597, Jangamiddela konda, ·2430, ·2345, down a streamlet to the range boundary; the range boundary to the Chinnangula banda penta. *West.*—The Chinnangula banda penta-Chinnarutla footpath to meet the Chinnarutla-Nekkanti bridle-path; the bridle path to the starting point.
			14. *Nekkanti Felling Series.*
I	10,333	750	*North.*—Starting from the junction of the Bansadevu kalva and the Nekkanti-Kuntalapadugu footpath near ·1750, along the said kalva to the Kuntalapadugu vagu; down the vagu and the Bandaleru to the Yerravagu near ·1430 b. *East.*—Up the said vagu via ·1510 to the foot of the Gundlakonda hill; a line passing through △1968 on the Gundlakonda hill and ·2320 to △2647 on Polichintala konda. *South.*—From △2647 a line to meet the source of the Samakura banda vagu; down the vagu to the Telugurayanicheruvu-Nekkanti bridle-path. *West.*—The said bridle-path to the Nekkanti-Kuntalapadugu footpath; the footpath to the starting point.
II	7,561	1,116	*North.*—Starting at the confluence of Yerra vagu with the Bandaleru near ·1430 b, down the Bandaleru to the Sankaragundam vagu. *East.*—Up the Sankaragundam vagu to the Guttalachenu-Madapachelama footpath near ·1500 b; the footpath to the Sankaragundam vagu once again; up the Sankaragundam vagu to ·2440; a line along the crest of hills through ·2600 to △2661; down a streamlet to the Darabailu vagu; down the vagu to the Guttalachenu-Darabailu footpath; the footpath to the Telugurayanicheruvu-Nekkanti bridle-path. *South.*—The said bridle-path to the Samakura banda vagu to its source; a line south-east to Polichintala konda △2647. *West.*—From △2647 along the crest of hills through ·2320, ·2980 to ·1968 Gundlakonda; a line to meet the source of a streamlet, down the streamlet to the Yerravagu via ·1510; down the Yerra vagu to the starting point.
III	7,746	796	*North.*—Starting from △2392 Darabailu penta on the Telugurayanicheruvu-Nekkanti bridle-path; along the Darabailu-Guttalachenu footpath to the Darabailu vagu; up the vagu and its feeder to △2661; a line along the crest of hills to ·2440 via. 2600; down the Sankaragundam vagu to the Guttalachenu-Madapachelama footpath. *East.*—The foot-path to the Gudimetta vagu near Madapachelama; down the vagu to the Madapachelama subordinates' quarters. *South.*—A spur leading to ·1700; the ridge ·1700, ·2220, △2505, ·2540, ·2430 ·2610, ·2450, to the Tumathoka-Gudimetta fire line; the said fire line to the Telugurayanicheruvu-Nekkanti bridle-path. *West.*—The bridle-path to the starting point.
			TURIMELLA RANGE.
			15. *Maddipenta Felling Series.*
I	7,929	2,342	*North.*—Starting from the Divisional boundary along the ridge through ·2270, ·2380, ·2290, ·2150, ·1760 to the Maddipenta-Chinnamantrala road; thence the Maddipenta-Papinenipalli road to the Jampal eru near ·1138; the said Eru to the Sim's line near ·1070. *East.*—The Sim's line to a cairn to the north-east of ·1380. *South.*—From the said cairn up the spur to ·1380; along the saddle and the ridge to the Gundlakamma-Turimella common range boundary; the said common Range boundary to the Divisional boundary. *West.*—The Divisional boundary to the starting point.

Coupe number. (1)	Total area in acres. (2)	Effective bamboo area in acres. (3)	Boundary description. (4)
			TURIMELLA RANGE—*cont.*
			15. *Maddipenta Felling Series*—cont.
II	4,445	2,348	*North.*—From △2847 on the common range boundary between Dornal and Turimella, the said boundary to the Chinnamantrala road. *East.*—The said road to the junction of the Devadarikorava footpath ; thence up the spur and along the ridge through ·1540, △2289, ·2120, ·2240, ·2230, Ontikonda, △2240, ·1930 to meet the junction of the Sim's line and the Komativanibhavi cart-track ; the Sim's line to the Jampal Eru near 1070. *South.*—The Jampal Eru to the Papinenipalli-Maddipenta road, ·1138 ; the said road to meet the Chinnamantrala road. *West.*—The Chinnamantrala road and the ridge through ·1690, ·2350, ·2720, ·2780 to the starting point.
III	5,231	2,645	*North.*—Starting from the junction of the divisional boundary and the Turimella-Dornal common range boundary the said common boundary to △2847. *East.*—Thence down the spur and along the ridge through ·2780, ·2720, ·2350, ·1690, to the Chinnamantrala road between the Pilhalapaya and its tributary the said road to the Tigal Eru. *South.*—Thence up the spur and along the ridge through ·1760, ·2150, ·2290, ·2380, ·2270, to ·2110 on the divisional boundary. *West.*—The divisional boundary to the starting point.
			16. *Turimella Plains Felling Series.*
I	10,072	1,250	*North.*—Starting from the junction of the Chinnamantrala road and the Dornal-Turimella common range boundary, along the common range boundary to meet the Cumbum Reserved Forest boundary. *East.*—The said reserve forest boundary to meet the Velagalapaya stream ; down the said stream to meet the Sim's line (the bamboo area on the eastern bank of the Velagalapaya is also included in the coupe). *South.*—The Sim's line to meet the cart-track from Komativani bhavi to the east of ·1270. *West.*—From the said junction up the spur to ·1930 and along the ridge through △2240, ·2230 Ontikonda, ·2240, ·2120, △2289, ·1540 ; down the spur to meet the Chinnamantrala road ; the said road to the starting point.
II	6,676	789	*North.*—Starting from ·1380 on the Sim's line, along the line to meet the Velagalapaya stream. *East.*—Down the Velagalapaya stream to meet the reserved forest boundary ; the said boundary to meet the Sim's line ; the Sim's line and up a stream to ·2710 on the common range boundary. *South.*—The common range boundary. *West.*—The common range boundary ; down a spur to ·1380 to the Sim's line ; the Sim's line to the starting point.
III	7,530	880	*North.*—Starting from ·2710 on the Gundlakamma-Turimella common range boundary, up the spur and along the saddle between ·2920 and △2954—and along the ridge through ·2750, ·2580, △2607, Goni Konda to ·2210. *East.*—Thence along the ridge through ·2010, ·1690, △1914, Urakonda, △1784, and down the spur to the Ralla vagu ; up the said vagu to ·1150 ; up the spur and along the ridge through ·1620 Guni konda, ·1710, ·1560 (a small bamboo area on the eastern bank of the Rallavagu is included in the coupe). *South.*—The ridge ·1990, ·1940, and thence through the saddle to ·1610 on the footpath and the source of Motu vagu ; down the said vagu to a point about 15 chains ; thence up the spur and along the ridge through △2475 to the Gundlakamma-Turimella common range boundary at a point about one furlong to the south-east of ·2180 ; the said common range boundary to the Medijeri fire line. *West.*—The said common range boundary to the starting point.
			MARKAPUR RANGE.
			17. *Bommilingam Felling Series.*
I	4,402	129	*North.*—Starting from a point near Motamu kunta where the common range boundary between Dornal and Markapur joins the Divisional boundary, along the common range boundary to the Chilakacherla-Marlapenta footpath near ·2630. *East.*—Along the footpath to the Kalanuthala-Bommilingam footpath. *South and west.*—Along the Kalanuthala-Bommilingam footpath to the common range boundary between Markapur and Dornal ; the said common boundary to the starting point.
II	2,637	130	*North.*—Starting from the point where the Bommilingam-Kalanuthala footpath crosses the Cumbum Reserved Forest boundary, the said footpath to meet a footpath east of Marlapenta. *East.*—The footpath for about a mile east of Marlapenta ; up the spur to ·2960 ; the ridge ·2960, ·2840. *South.*—The ridge ·2840, ·2838 Marlakonda ; down a streamlet to meet the Cumbum Reserved Forest boundary near ·1460. *West.*—The Cumbum Reserved Forest boundary to the starting point.
III	5,223	109	*North.*—Starting from the junction of a streamlet with the Cumbum Reserved Forest boundary near ·1460, up the streamlet to its source ; the ridge ·2838 Marlakonda, ·2840. *East.*—The ridge ·2840, ·2950, ·2922, ·2910, ·2720, ·2640, ·2260, ·2500, △2287 ; thence down the Kalanuthala sela to meet the common boundary between the Cumbum Reserve Forest and the Eastern Nallamalais Block 4 reserve forest. *South.*—The common boundary between the Cumbum Reserved Forest and the Eastern Nallamalais Block 4 reserved forest. *West.*—The Cumbum Reserved Forest boundary to the starting point.

SECTION 6.—OTHER REGULATIONS.

425. *Grazing.*—The evil effects of grazing in bamboo areas, especially when regeneration is on the ground, are generally recognized. No restriction on grazing will, however, be imposed as the bamboo working circle comprises a large area and even partial closure would be detrimental to popular interests.

426. *Fire protection.*—The working circle will receive such fire protective measures as are prescribed in the "Miscellaneous Regulations" for the fire protection of timber and bomboo areas. Generally speaking, reserve boundaries, roads, bridle paths and frequented footpaths will be cleared and fire traced annually.

427. *Record of Statistics.*—The contractor will be required to furnish monthly statements of all removals of bamboo made by him. The gross number of bamboos extracted, the number of bamboos converted into each locally recognized class and the current price of each class should be furnished by the contractor. Every endeavour should be made to obtain accurate outturn figures as this is an important matter.

428. *Control.*—A Control Book and a Record of Works will be maintained.

CHAPTER VII.—WORKING PLAN FOR THE FUEL WORKING CIRCLE.

SECTION 1.—GENERAL CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF THE VEGETATION.

429. *General.*—The demand for firewood in rural centres bordering on forests is inappreciable. This is partly due to the poverty of the people who cannot afford to pay for fuel, and partly to the existence of shrotriyam forests, trees on patta lands and unreserves which supply the general requirements of the rural population. The ordinary villager uses stalks of field crops and cakes of cowdung as fuel and, if the forest is close by, resorts to stealing dead wood from it. Fuel undertakings can be remunerative only if organized supply can be made to urban or industrial demands. No local industry absorbs any appreciable quantity of wood from the forests except sugar cane boiling near Cumbum which consumes small twigs and faggots. Important rural centres which can absorb firewood from the reserves are Cumbum, Giddalur and Markapur. Supplies to Markapur are at present adequately met from the neighbouring zamindari and shrotriyam forests, and firewood from reserves does not command a remunerative market at Markapur as the reserves are distantly situated and communications are in a bad state of repair. Two series, viz., Regatikunta and Magatur, were opened for the supply of fuel to Markapur but they have been inoperative due to lack of demand. The requirements of Yerragondapalem are amply met from supplies from the Panchayat forest and the unreserves. The unreserves round about Cumbum and Giddalur have been stripped almost bare of vegetation in the past, so that the town folk are compelled to depend on supplies from the reserves for fuel. Fuel from the reserves therefore commands a reasonable sale price in the localities of Cumbum and Giddalur. The fuel requirements of Cumbum and Giddalur are 1,800 tons and 2,280 tons per annum respectively. On the assumption that half of this requirement may still be supplied from private resources, the other half will have to be supplied from the reserves.

430. *Object.*—The object of this working circle is therefore to supply firewood to the localities of Cumbum and Giddalur primarily and incidentally to smaller rural centres like Allinagaram, Chintalapalle, Mokshagundam, Galjerigulla, Papinenipalli, Jallivaripullalacheruvu, etc. In addition to supplying fuel, the annual coupes will produce small quantities of building materials for small house construction and for agricultural timber.

431. *Crop.*—The forest consists of inferior deciduous species of fairly good fuel value with scattered *Hardwickia binata*. The principal species composing the crop are *Anogeissus latifolia*, *Hardwickia binata*, *Albizzia amara*, *Chloroxylon swietenia*, *Ixora parviflora*, *Soymida febrifuge*, etc. The density of stocking is fair and the canopy is open. Trees seldom attain a height of 30 feet and a girth of 24 inches. Unsoundness in trees sets in early probably due to inhospitable local conditions. Undergrowth consists principally of grass which is grazed by large herds of village cattle.

432. *Constitution.*—All well stocked fuel areas within reasonable distance to render exploitation remunerative and fairly accessible to bullock carts are included in this working circle. Steep hill slopes have been avoided.

433. *Area.*—The area of the working circle is 27,511 acres.

434. *Felling.*—The working circle is divided into thirteen felling series. The following statement compares the position with regard to fuel supply under the former plans with present proposals.

Statement showing the position with regard to fuel supply in the past as compared with present proposal.

Under former working plans.					Under the new working plan.					
Serial number.	Range.	Name of series.	Area in acres.	Rotation years.	Serial number.	Range.	Name of series.	Area in acres.	Rotation years.	Remarks.
					1	Gundlakamma.	Donibhavi ..	1,634	30	New series.
1	Giddalur ..	Diguvametta ..	2,400	30	2	Giddalur ..	Diguvametta ..	2,440	30	
2	Do. ..	Kothakota ..	2,606	30	3	Do. ..	Kothakota ..	2,454	30	
3	Do. ..	Sudalabodu ..	3,480	30	4	Do. ..	Khajipuram ..	1,320	30	New series.
4	Turimella ..	Boggulasorava ..	300	30						
5	Do. ..	Somidevipalli ..	1,500	30	5	Do. ..	Mallalamma ..	4,654	30	These four series were originally worked for small timber but now they have been included under Fuel Working Circle.
6	Do. ..	Tallapaya ..	900	30	6	Do. ..	Chintalapalli ..	2,180	30	
7	Do. ..	Tummalapenta ..	1,668	30	7	Do. ..	Veerareddikunta.	2,897	30	
8	Do. ..	Utla	900	30	8	Do. ..	Yerraguntla ..	2,805	30	
9	Do. ..	Vemulakunta ..	2,800	30	9	Turimella ..	Somidevipalli ..	1,456	30	
10	Do. ..	Birenimulla ..	1,000	30	10	Do. ..	Tummalapenta ..	1,935	30	
11	Do. ..	Bollupalli ..	1,200	30	11	Do. ..	Utla	1,146	30	Item numbers 4, 6, 10, 11 and 13 under former working plans are abandoned as there is no demand for them.
12	Do. ..	Gurralakonda ..	932	30	12	Do. ..	Vemulakunta ..	1,690	30	
13	Do. ..	Lingamayya-kuruva.	750	30	13	Do. ..	Gurralakonda ..	900	30	
14	Do. ..	Malemanikunta.	1,244	30	..	..	....	..	..	
15	Do. ..	Uppukontipaya.	1,228	30	..	..	....	..	..	Abandoned as there is no demand.
16	Markapur ..	Magatur	820	30	..	..	....	..	..	
17	Do. ..	Regatikunta ..	866	30	..	..	....	..	..	
		Total ..	24,594				Total ..	27,511		

SECTION 2.—METHOD OF TREATMENT.

435. *Silvicultural system.*—The silvicultural system will be simple coppice. Some of the series in Giddalur Range were hitherto worked under the Agricultural Implement Working Circle under a system of reservation of standards and advance growth of valuable species but the efficacy of such a system in a poor open type of forest which is largely intended to supply fuel is open to question as the object is to reproduce by coppice. Trees of *Feronia elephantum* and tamarind will be reserved from fellings for the fruits they yield.

436. *Rotation.*—The requirements of the market are for billets about 18 inches in girth. Measurements of coppice shoots in coupes felled in the past indicate that the mean annual girth increment of fuel species is in the neighbourhood of 0·6 of an inch. A period of 30 years will be required to produce the size required by the market. Previous working plans have adopted a rotation of 30 years uniformly and there is no necessity to depart from it. A rotation of 30 years is, therefore, fixed.

437. *Division into coupes.*—The felling series, their division into coupes, and the coupes felled in the past are shown on separate detailed maps Survey of India sheets 4″ = 1 mile. Only ten coupes that are to be exploited during the period of the plan are indicated on the maps. One continuous serial has been maintained in numbering the coupes.

438. *Yield.*—An approximate forecast of annual yield from each series is given below based on a rough ocular estimate as well as on the basis of past realizations :—

Range.	Series.	Average annual coupe in acres.	Approximate forecast of annual yield in cubic feet. Small timber.	Fuel.
1 Gundlakamma	Donibhavi	55	..	5,500
2 Giddalur	Diguvametta	81	120	11,664
	Kothakota	81	..	7,938
	Khajipuram	40	..	4,000
	Mallalamma	155	310	21,855
	Chintalapalle	70	2,590	16,800
	Veerareddikunta	96	672	19,200
	Yerraguntla	93	4,650	6,510
3 Turimella	Somidevipalli	48	..	3,500
	Thummalapenta	64	..	30,208
	Utla	38	..	15,960
	Vemulakunta	56	..	15,120
	Gurralakonda	30	..	6,000
			8,342	1,64,255 or about 2,000 tons of fuel.

SECTION 3.—METHOD OF EXECUTING THE FELLINGS.

439. *Exploitation.*—Annually one coupe in each series will be taken up for exploitation in the serial order given under the 'tabular statement of fellings.' The coupes have not been assigned to definite years of working so that if a coupe remains unexploited in one year it will not constitute a deviation from the working plan. If for any valid reasons, which should be recorded in the Control Journal, a coupe is unexploitable the next coupe may be exploited in the following year. Reasons for the non-saleability of the coupe should be reported to the Conservator and his previous approval should be obtained before the next coupe is sold. Unfelled portions of sold coupes will be resold in the following year along with the annual coupe preference being given to the current year's lessee to buy the unworked portion. If, however, such unfelled portions are unworkable or if there is no demand for them they should be surveyed and plotted and the facts should be reported to the Conservator for his approval for deleting them from the sale list.

440. *Demarcation.*—The coupe due for exploitation in the following year will be laid out with reference to the detailed maps, demarcated by a cut line 6 feet wide all round it, surveyed and plotted to scale early in the month of December. The produce obtained from clearing the lines will be stacked and handed over to the contractor after collecting the felling charges. Each coupe will be divided into a suitable number of strips not exceeding five. The strip lines should run across the contours as far as practicable. The felling of indicator areas is not prescribed as they are of no practical value nor are the forests so valuable as to necessitate their felling.

441. *Sale.*—The annual coupes will be sold in public auction in the month of February to a contractor who will do the simple coppice felling. The period of lease will be one year from the 1st of April. Fellings should normally be completed by the end of December and time for removal of the felled produce will be given till the end of March. In localities where a demand for green manure leaves exists the lessee of fuel coupes will be permitted to cut and collect twigs and leaves over the entire annual coupe throughout the period of the lease. Government in their Order Ms. No. 1573, Development, dated 14th July 1937, have stated that collection of manure leaves in localities where a demand for it exists should be allowed three months before commencement of regular fuel fellings. The demand for manure leaves arises only between the months of July and December and fuel fellings commence from the 1st of April. The object will not be achieved if the coupes are leased for three months for collection of manure leaves from the 1st of January. Hence provision has been made that collection of manure leaves may be made throughout the year from the annual coupes.

442. *Felling rules.*—The following felling rules will be observed :—

(1) All trees and woody growth in the coupe required by the contractor except tamarind and *Feronia elephantum* may be felled. Felling will be done as close to the ground as possible leaving a clean, slant surface. Care should be taken to see that the bark is not stripped from the stool. Special trimming of the stools is unnecessary. Contractors should be encouraged to leave small advance growth of fuel species in areas not selected for concentrated regeneration.

(2) Fellings in a coupe will progress strip by strip commencing from the top in a systematic manner. Permission to work the next strip will not be granted until work in the previous strip has been completed, inspected and passed as satisfactory by the Range Officer.

(3) All wood above 5 inches in girth should be stacked before removal. Removal of material below 5 inches in girth either in head-loads or in carts may be permitted at the discretion of the District Forest Officer.

(4) Manufacture of charcoal may be permitted on previously approved sites within the coupe. The lessee should be informed that yepi (*Hardwickia binata*) trees, though unsound, yield good quality charcoal, which can be marketed at a profit at Cumbum, Giddalur or Guntur.

SECTION 4.—TABULAR STATEMENT OF FELLINGS.

443. The order in which the coupes are to be felled and their areas are given in the following statement :—

Statement showing the order in which the coupes are to be felled and their areas.

Gundlakamma Range.		Giddalur Range.											
Donibhavi Series.		Diguvametta Series.		Kothakota Series.		Khajipuram Series.		Mallalamma Series.		Chintalapalli Series.		Veerareddikunta Series.	
Coupe number.	Area in acres.	Coupe number.	Area in acres.	Coupe number.	Area in acres.	Coupe number.	Area in acres.	Coupe number.	Area in acres.	Coupe number.	Area in acres.	Coupe number.	Area in acres.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
I	54	VIII	80	VIII	76	I	46	VIII	146	X	70	VII	96
II	55	IX	78	IX	72	II	42	IX	147	XI	70	VIII	93
III	53	X	73	X	82	III	40	X	152	XII	70	IX	100
IV	55	XI	80	XI	81	IV	44	XI	150	XIII	68	X	97
V	53	XII	78	XII	83	V	41	XII	150	XIV	66	XI	96
VI	53	XIII	80	XIII	80	VI	43	XIII	148	XV	70	XII	99
VII	55	XIV	72	XIV	81	VII	41	XIV	153	XVI	66	XIII	96
VIII	55	XV	73	XV	85	VIII	42	XV	150	XVII	73	XIV	100
IX	53	XVI	73	XVI	83	IX	39	XVI	150	XVIII	70	XV	96
X	55	XVII	76	XVII	83	X	39	XVII	150	XIX	70	XVI	94
Total ..	541	..	763	..	806	..	417	..	1,496	..	693	..	967

Giddalur Range.		Turimella Range.									
Yerraguntla Series.		Vemulakunta Series.		Thummalapenta Series.		Utla Series.		Gurralakonda Series.		Somidevipalli Series.	
Coupe number.	Area in acres.	Coupe number.	Area in acres.	Coupe number.	Area in acres.	Coupe number.	Area in acres.	Coupe number.	Area in acres.	Coupe number.	Area in acres.
(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
VIII	110	VII	56	XIV	65	IX	37	VI	30	XIV	61
IX	100	VIII	56	XV	63	X	38	VII	30	XV	51
X	95	IX	56	XVI	64	XI	37	VIII	30	XVI	52
XI	97	X	56	XVII	65	XII	37	IX	30	XVII	50
XII	100	XI	56	XVIII	66	XIII	39	X	30	XVIII	50
XIII	101	XII	55	XIX	65	XIV	37	XI	29	XIX	50
XIV	93	XIII	56	XX	62	XV	37	XII	29	XX	50
XV	99	XIV	56	XXI	64	XVI	39	XIII	29	XXI	51
XVI	98	XV	56	XXII	66	XVII	40	XIV	30	XXII	50
XVII	94	XVI	56	XXIII	68	XVIII	39	XV	30	XXIII	50
Total ..	987	..	559	..	648	..	380	..	297	..	515

SECTION 5.—SUBSIDIARY SILVICULTURAL REGULATIONS.

444. *Regeneration.*—Natural reproduction from coppice supplemented by such natural seedling regeneration of fuel species as may be present will be depended on to restore the tree canopy in felled areas. Concentrated plantations of valuable fuel species will be raised in areas specially selected for their suitability, but there will be no more rab or other form of artificial regeneration automatically carried out, as hitherto, in every fuel coupe regardless of the prospect of success.

445. *Choice of area.*—The area for concentrated regeneration should support good, deep soil free from boulders, should be accessibly situated to centres of labour and to the market, and the stocking should be such that it could be improved by planting. Steep slopes, bouldery ground, saline or calcareous soils and areas which already contain a full stock of fuel species should not be selected. In each of the ranges of Gundlakamma, Giddalur and Markapur, the best areas for planting will be selected by the District Forest Officer.

446. *Unit of regeneration.*—Annually, in each range as large an area as the management can plant up conveniently will be selected progressively from one end of the block.

447. *Treatment.*—The area will be surveyed and demarcated and the standing growth will be exploited, if it is marketable, care being taken to ensure that enough debris and slash is left behind for burning. The area will be clearfelled and burnt before the middle of April and preferably in March. Every effort should be made to introduce ' kumri '; if the people are not willing, departmental kumri may be done; if neither is possible, regeneration on ' rab ' system may be confined to strips 5 feet wide and 22 feet apart, the remaining area being left to coppice. If ' kumri ' is undertaken the distance between the sown lines should be not more than 22 feet. The object should be to obtain full stocking at minimum cost, but no necessary silvicultural operation should be omitted on the score of expense.

448. *Soil working.*—Soon after the burn, when the ground has cooled down, the area will be ploughed so as to fix the mineral ash in the soil. Subsequent soil working will be done as in ordinary agricultural practice and to the extent the forest crop requires it.

449. *Sowing.*—The following species will be suitable for sowing in June or earlier after a preliminary shower of rain is received. *Chloroxylon swietenia, Albizzia amara, Acacia leucophlœa, Azadirachta indica, Acacia sundra, Hardwickia binata* and *Soymida febrifuga.* Sowings will be repeated till full stocking is obtained.

450. *General.*—A good burn, fixing the mineral ash in the soil, intensive soil working and full stocking in the first year are essentials to success. The general lines on

which concentrated regeneration is to be done are contained in Chief Conservator's Mis. No. 31 of 1941, dated 17th January 1941, and the annual administration reports of the Provincial Silviculturist. In successfully stocked lines care must be taken to see that the seedlings are not overcrowded. Adequate growing space is of great importance.

SECTION 6.—OTHER REGULATIONS.

451. *Demarcation.*—At the next working plan revision, it is probable that the compartment system will be introduced. There is therefore no necessity for permanent demarcation of coupes by boundary stones.

452. *Grazing.*—Felled areas will be closed to grazing for a period of four years from the year of felling. Closure for a longer period will be a hardship on the villagers in respect of their grazing requirements as the fuel areas are close to village lands. Four years is considered just sufficient for the coppice to withstand damage by cattle. The order of felling has been so arranged as to cause minimum inconvenience to villagers regarding access through the series to the grazing grounds above.

453. *Fire protection.*—No special measures of fire protection will be undertaken.

454. *Control.*—A Control Book, a Record of Works, a Regeneration Ledger and a Control Map will be maintained.

CHAPTER VIII.—WORKING PLAN FOR THE GRAZING WORKING CIRCLE.

SECTION 1.—CONSTITUTION OF THE WORKING CIRCLE.

455. *Constitution.*—The Grazing Working Circle comprises all the reserved forests of the division under departmental control with the exception of certain specified areas which are, or may be, closed to grazing on silvicultural considerations or for other reasons. Such areas will fall under two categories :—

(*a*) Areas which are progressively and for stated years closed to grazing in the various working circles on silvicultural considerations mainly with a view to assisting the regeneration in them, both natural and artificial.

(*b*) Areas which are temporarily closed to grazing both as a punitive measure and as a silvicultural safeguard as a deterrent against malicious burning by the people and for the recuperation of the forests damaged by fire. Areas which will be closed to grazing progressively and from time to time for a stated number of years will consist of—

(1) Plantations formed in the Timber Working Circle. Maximum area 50 acres.

(2) Felled coupes in the Pole Working Circle will be closed for a period of four years from the year of felling. Maximum area 1,180 acres.

(3) Regeneration areas in the Small Timber Working Circle will be closed for a period of ten years from the year of formation. Maximum area 350 acres.

(4) Plantations in the Softwood Working Circle which will be closed during the period of the plan. Maximum area 150 acres.

(5) Felled coupes in the Fuel Working Circle for a period of four years from the year of felling. Maximum area 3,668 acres.

(6) Artificially regenerated areas in the Manure Leaf Working Circle. Years not prescribed. Maximum area 270 acres.

(7) Rotational grazing experiment on the Veligondas and two demonstration centres will be closed to general grazing during the period of the experiment. Area 1,280 acres.

(8) Grass centres in the Grazing Working Circle till the grass is established. The area cannot be forecasted at present but it may be roughly 600 acres.

The total area that is likely to be closed to grazing on silvicultural considerations is only 7,548 acres which forms a negligible percentage of the total area that will be open to grazing.

SECTION 2.—METHOD OF TREATMENT.

456. *Objects.*—The objects of management in regard to this working circle are—

(*a*) To provide for grazing in the reserves for local, district and foreign cattle consistent with the conservation of the forests and the objects of management of the other working circles;

(*b*) to produce revenue to the State by imposing a small fee for licensing cattle to graze and pen in the reserves;

(c) to distribute the incidence of grazing by a suitable arrangement of the pentas;

(d) to improve the grazing grounds by—

(1) undertaking improvements to the existing watering facilities and by creating new ones in places where none exists at present,

(2) undertaking departmental rotational burning of grazing grounds on the plateau with a view to maintaining and, if possible, improving the grazing and distributing the incidence more evenly;

(e) to improve existing pastures by introducing a system of rotational grazing to start with experimentally with possibilities of expansion, should the system find favour with the people;

(f) to create fresh pastures in forests bordering on village lands, which are rapidly deteriorating as grazing grounds, in combination with temporary cultivation by the villagers;

(g) to provide measures for the better maintenance of the penta sites and to improve the local breed of cattle; and

(h) to conduct experiments in the manufacture of silage and hay to popularize these among the villagers so that they may keep a store of fodder in times of scarcity and as an insurance against years of fodder famine.

The policy of Government in regard to grazing in general has been discussed in detail in Chapter V of Part I and the following prescriptions are formulated in conformity with the existing policy and to achieve the above objects of management.

457. *Regulation of grazing.*—Grazing will be regulated by the issue of permits subject to the usual conditions. Permits will be valid for one year from the 1st of April. Goats will not be admitted inside reserved forests except those belonging to the Chenchus subject to the maximum number admitted at settlement in respect of each gudem. Free permits will be issued to Chenchu cattle and goats up to the maximum number admitted at the time of settlement. All other cattle will be allowed to graze in the reserves on the purchase of permits at the following rates in conformity with the orders of Government contained in their No. 836, Press (Development), dated 29th March 1938, wherein a reduction of the grazing fees by 50 per cent was ordered :—

Particulars. (1)	Sheep. (2)	Cows and bulls. (3)	Buffaloes. (4)
Non-penta permits.			
	RS. A. P.	RS. A. P.	RS. A. P.
1 'Local cattle' for grazing in the whole division and penning in the approved pentas of the range to which the village has been allotted in the list	0 2 0	0 4 0	0 6 0
2 'Non-penta' cattle for grazing only over the whole division applicable only to 'District' cattle living within the district of Kurnool	0 2 0	0 4 0	0 6 0
Penta permits.			
3 'Penta cattle' for grazing over the entire division and penning in the approved pentas of one range only	0 4 0	0 8 0	1 0 0
4 'Penta cattle' for grazing over the entire division and for penning in any of the approved pentas of the division	0 5 0	0 10 0	1 5 0

458. *Local cattle.*—The term 'local cattle' was hitherto applied to cattle in the village or villages within the limits of which the reserve is situated or it adjoins. This definition is somewhat loose and inequitable, and when it is literally applied, as has been done in the past, the cattle of a village or a hamlet which lies in the proximity of a reserve line may be denied this privilege because the limits of the village do not adjoin or include the reserve. The adoption of a uniform standard would be more equitable and appropriate and towards this end cattle which are owned by *bona fide* agriculturists in hamlets or villages of the division which lie within a distance of five miles from the nearest boundary of a reserved forest, which is under departmental management, will be considered to be 'local cattle.' Only that portion of the revenue village which falls within the five-mile limit will be entitled to this privilege. The following statement shows the hamlets and villages which will be entitled to the concessions for 'local cattle.' In the case of villages lying on the common boundary between two ranges, enquiries have been made as to the penning requirements and the village has been allotted to the range in which the penning is usually sought. The District Forest Officer will however have discretion to assign border land villages to suitable ranges if there should be a difference between what is provided in the list and actual practice.

List of villages and hamlets entitled to local cattle concessions.

Serial number. (1)	Revenue village in which the hamlet in column (3) is situated. (2)	Hamlets entitled to local cattle concessions. (3)	Pentas in which the concessions may be exercised. (4)
		DORNAL RANGE.	
1	Nallagunta	Nallagunta	Thumagundam, Medigundam and Kurapenta.
2	Cherlopalli	Eguvacherlopalli and Chilakacherla.	Sudagulapenta and Narlapayapenta.
3	Edavali	Edavali, Ghantavanipalli and Kottur.	Undraguntlapenta and Nallamadugupenta.
4	Ayyinamukkala ..	Ayyinamukkala, Thimmapuram and Kadapurajupalli.	Kudupa, Chinnangula Bandapenta and Candapenta.
5	Dornal	Dornal and * Husena banda	Thummalabailu.
6	Chinna Dornal ..	Jammi Dornal and * Gudipad ..	Chinna Chama and Chintala.
7	Pedda Bommalapuram.	Pedda Bommalapuram	Talakunta, Maripalem and Jedalapenta.

* Actually lies in Markapur Range but the cattle resort to the pentas in Dornal Range.

GUNDLAKAMMA RANGE.

There are no villages bordering on Gundlakamma Range and no local cattle concessions may be exercised in the pentas of that range.

GIDDALUR RANGE.

1	Krishnamsettipalli ..	Krishnamsettipalli and Akkalareddipalli.	Bodipenta, Ragimanipenta, Inuparatipenta, Pasineellapenta, Jarripothupenta, Chintamanipenta, Daduvaripenta, Jillelapenta, Nettudupenta, Chittakonipenta and Pavuralamadugupenta.
2	Kanchipalle	Kanchipalle, Bainapalle, Rajupeta and Upparavaripalle.	
3	Mundlapadu	Mundlapadu, Kottaburuyupalle and Venkatapuram.	
4	Kothakota	Kothakota and Tallapalle.	
5	Sanjivaraopeta ..	Sanjivaraopeta, Obalapuram, Doddipalle, Ankireddipalle and Dantilapalle.	
6	Gadikota	Gadikota, Chevulapalem, Krishnapuram and Jummalapalle.	
7	Uyyalavada	Uyyalavada, Vettamuslipalle, Hissesurapalle, Lingapuram, Singampalle, Ankammapalle, Adimurthipalli, Jemullapalli and Dudekulapalle.	
8	Kommanuru	Kommanuru, Vemulapadu, Igumnapalle, Brahmanapalle and Nallaguntla.	
9	Bodinenipalli	Bodinenipalli, Kattirallapalle, Lingareddipalle, Vennampalle, Krishnampalle, Suravaripalle, Mottupalle, Budampalle, Bangayapalle, Ramavaripalle and Payalapalle.	
10	Rajupalem	Rajupalem, Routupalle, Ravulapalle, Dwarakacherla and Venkatapuram.	
11	Nallaguntla	Nallaguntla, Bontahalle and Ayyavaripalle.	
12	Idammakallu	Idammakallu, Mokatampuram, Kattulavaipalle, Balareddipalle and Narasimhunupalle.	
13	Pullareddipalli ..	Pullareddipalli, Erramsettipalle and Gobarapalle.	
14	Chintalapalle	Chintalapalle, Kasinepalle, Kurakuvanipalle, Vardanapalle, Kottapalle, Obalapuram, Malikapalle, Mittamidipalle and Tekulapenta.	
15	Guntapalle	Guntapalle.	
16	Komarolu	Hanumantharayanapalle, Sarvareddipalle, Bontapalle, Tatireddipalle, Purushotamanupalle, Bavapuram and Gopalunipalli.	
17	Brahmanapalle ..	Brahmanapalle and Mutamedapalle.	
18	Reddicherla	Reddicherla, Pochupalle, Mallareddipalle, Errapalle, Pamurapalle, Madavapalle, Kanepalle, Mulapalle and Madantapuram.	
19	Allinagaram	Allinagaram, Vontiorpamanipalle, Erragunta, Timmareddipalle and Maduva.	
20	Tambalapalle ..	Tambalapalle.	
21	Daddavade	Gundreddipalle, Doddavade, Govindupalle, Harisamanthunipalle, Narayanapalle, Venkatampalle, Pottipalle, Akkapalle and Kankaranaipalle.	

Serial number. (1)	Revenue village in which the hamlet in column (3) is situated. (2)	Hamlets entitled to local cattle concessions. (3)	Pentas in which the concessions may be exercised. (4)
		GIDDALUR RANGE—*cont.*	
22	Padilekondapalle ..	Padilekondapalle, Tirupathipalle and Eguvapathreddipalle.	
23	Narava	Narava, Krishnamrajupalle and Bainapalle.	
24	Tsattireddipalle ..	Tsattireddipalle and Mittamidepalle.	
25	Giddalur	Giddalur.	
26	Modampalle	Modampalle.	
27	Edavalle	Edavalle, Lingareddipalli, Cherlopalle and Ankireddipalle.	
28	Nagareddipalle ..	Nagereddipalle.	
29	Gudimetta	Gudimetta, Atchampalle, Kottapalle and Ramapuram.	
30	Mokshagundam ..	Mokshagundam, Penchikalapadu, Muturajupalle, Hasanapuram and Taticherla.	
31	Pusalapadu	Pusalapadu, Setticherla and Pandillapalle.	
32	Venduta	Venduta.	
33	Lanjakotte	Lanjakotte and Telladinne.	
34	Aurangabad	Aurangabad.	
35	Retlapalle	Retlapalle and Mottupalle.	
36	Pedda Obanayanapalle	Pedda Obanayanapalle.	
37	Chinna Obanayanapalle.	Chinna Obanayanapalle.	
38	Ravipadu	Ravipadu.	
39	Salakalavidu	Salakalavidu, Kalugotta and Kottapalle.	
40	Pittikayagulla ..	Pittikayagulla, Vengapadu, Mallapuram, Kotturu and Janapalacheruvu.	
41	Khajipuram	Khajipuram.	
42	Madanapullalacheruvu.	Madanapullacheruvu, Kottapeta and Akkapalle.	
43	Basinepalle	Basinepalle, Chantapuram, Chetukupalle and Chinnivenipalle.	
44	Pachala Venkatapuram.	Pachala Venkatapuram.	
45	Galijergulla	Galijergulla, Singaripalle, Balakunta, Anumayapalle and Chenupalle.	
46	Konapalle	Konapalle, Singasanipalle, Namburivanipalle, Goburavanipalle, Naruvinapalle, Buthuvanipalle and Pogulla.	
47	Hazaratgudem ..	Hazaratgudem and Kajitalagudem.	
48	Nekunambodu ..	Nekunambodu.	
		GANJIVARIPALLI RANGE.	
1	Venkatadripalem * ..	Ganjivaripalli and Jangamvaripalle.	Panalabailu, Chinna Gangavaram and Pedda Gangavaram.
2	Kolukula	Kolukula, Chinna Kolukula and Chennarayanipalle.	Nekkanti and Mallagundam.
3	Sanikavaram † ..	Sanikavaram, Maserapukunta, Maddalakotta, Ramayapalem and Ghatlumade Agraharam.	Ghat penta, Boyalakotapenta, Kuntalapadugu, Yepilapenta, Guttala chenu and Maddulagutla.
4	Regumanipenta ..	Regumanipenta and Potampalle ..	Gudimetta.
5	Amanigudipadu ..	Amanigudipadu	Palutla, Darabailu, Muntaluti, Telugurayanicheruvu and Marripenta.
6	Gurappasala ‡	Guruppasala, Gangapalle, Battuvanpalle and Tambalapalle.	Yelagalakunta, Daddanala, Tungetipenta, Telugakunta, Budhoti, Morricheruvu, Pullavuladona, Medimanichelika, Maddappachelima, Sudda, Peddarutla, Jangamiddala, Arepenta, Bhavipenta and Jadalapenta.
		TURIMELLA RANGE.	
1	Velagalapaya	Valagalapaya	Arimanipenta and Yerraipadaipenta.
2	Gannepalle	Gannepalle	Bandlachilakapenta.
3	Bollupalle	Bollupalle	Pilliguntlapenta.
4	Papinenipalle	Papinenipalle and Anakabhupalapuram.	
5	Ardavidu	Ardavidu, Atchampeta and Narayanapalle.	Yerrapenta.
6	Akavidu	Akavidu, Aravitikota and Kottapalle.	Jinkanaranapenta.
7	Chinnaganipalle	Chinnaganipalle and Achampeta ..	Juvvimanipenta.
8	Chollavidu	Chollavidu, Shazapalle and Akkapalle.	
9	Jallivaripullacheruvu.	Jallivaripullacheruvu	Jerripenta.
10	Amimanapalle ..	Amimanapalle, Gantavaram and Pottamsettipalle.	
11	Turimella	Turimella, Madarupalle and Narasareddipalle.	Tuvvakuntapenta.
12	Errabalem	Errabalem, Chinnanallakalva and Naravakindipalle.	
13	Lingapuram	Lingapuram, Hussainpuram and Peddanallakalva.	
14	Bogolu	Bogolu and Mohideenpuram.	

* On the common boundary between Ganjivaripalli and Yerragondapalem Ranges.
† Though situated in Markapur Range the cattle go to Ganjivaripalli Range for grazing.
‡ Lies on the common boundaryf or three ranges but is in Markapur Range ; the cattle go to Ganjivaripalli Range forests.

Serial number.	Revenue village in which the hamlet in column (3) is situated.	Hamlets entitled to local cattle concessions.	Pentas in which the concessions may be exercised.
(1)	(2)	(3)	(4)
		TURIMELLA RANGE—*cont.*	
15	Somidevipalle	Somidevipalle and Sangapeta.	
16	Palakavidu	Palakavidu, Silamvenkatapalle, Anumanavidu and Obulareddipalli.	
17	Gudimetta	Gudimetta, Vaddulavagupalle and Obalapuram.	
18	Racherla	Racherla, Palluguttapalle, Gananapalle and Kalavapalle.	
19	Edavalle	Edavalle and Santyavolu.	
20	Thimmapuram ..	Thimmapuram and Thellatipe.	
21	Giddalur	Giddalur, Kottapalle, Peddapayapalle and Payalapalle.	
22	Kondapenta	Kondapenta.	
23	Krishnasettipalle ..	Krishnasettipalle and Uppalapad ..	Karakamanipenta and Reginepillaguntapenta.
24	Ambavaram	Ambavaram, Vengalreddipalle, Jayaramapuram, Yellupalle and Lambadi huts.	
25	Jaggambailukrishnapuram.	Jaggambailukrishnapuram.	
26	Chinnacumbum ..	Chinnacumbum, Govindapuram and Darga.	
27	Bestavarapet	Bestavarapet.	
28	Cumbum	Cumbum.	
29	Chintalapalem ..	Chintalapalem.	
30	Parumamillapalle ..	Parumamillapalle.	
31	Somavarapeta ..	Somavarapeta and Adivaropeta.	
		MARKAPUR RANGE.	
1	Kalanutala	Kalanutala, Nagulavaram, Chintalamudipi and Gundamcherla.	Katamraju, Savakuntapenta and Marlapenta.
2	Sunkesula	Sunkesula	Errageddaselapenta.
3	Gottipadiya	Gottipadiya.	
4	Badvidu	Badvidu, Cherlopalle and Kottacherlopalle.	
5	Pedda Aravidu ..	Pedda Aravidu, Chinna Aravidu, Siddirayanipalle and Putsakayalapalle.	
6	Gobburu	Gobburu.	
7	Boyadagumpala ..	Boyadagumpala and Karollu.	
8	Devarajugattu ..	Devarajugattu and Sivapuram.	
9	Nikarampalle	Nikarampalle.	
10	Kolabhimunipadu ..	Kolabhimunipadu and Kottapalle.	
11	Jammunipalle ..	Jammunipalle.	
12	Vemulakotta	Vemulakotta and Kottapalle.	
13	Chintakunta	Chintakunta.	
14	Thippayapalem ..	Thippayapalem and Birudulanarava.	
15	Bhupathipalle ..	Bhupathipalle, Mittamidipalle and Morasamidipalle.	
16	Gannepalle	Gannepalle, Yachavaram, Poturajutur and Rangapuram.	
17	Magatur	Magatur and Bojireddipalle.	
18	Donakonda	Donakonda and Veerabhadrapuram.	
19	Peddakandukur ..	Peddakandukur, Maddalamudaka, Chinnakandukur and Sankarapuram.	
20	Kakerla	Kakerla and Sitamagulavaram.	
21	Kuttakanipalle ..	Kuttakanipalle, Ramachandraniuddu and Chintala Agraharam.	
22	Chinna Dornal ..	Chinna Dornal.	

459. "*District cattle*".—Cattle belonging to '*bona fide*' agriculturists living in villages within the district of Kurnool but beyond a radius of five miles from the nearest reserved forest boundary will be termed 'district cattle.' If such cattle resort to day grazing only it would suffice if ordinary permits at non-penta rates are taken out but in case they seek penta grazing later on the difference between non-penta and penta rates will be collected.

460. *Penta cattle.*—All cattle which do not fall under the category of 'local' or 'district cattle,' and all cattle belonging to professional cattle breeders including Sugalis and Lambadis though living within the district of Kurnool, and all cattle coming from outside the district of Kurnool for grazing irrespective of the fact whether they resort to penta grazing or not, will be considered to be 'penta cattle' and will be charged penta rates. Cattle belonging to Sugalis or Lambadis who, however, own lands within a distance of five miles from the reserved forest boundary will be entitled to take out permits at non-penta rates subject to a maximum of one pair of cattle for every 30 acres of dry cultivation or part thereof, and two pairs of cattle for every ten acres of wet cultivation or part thereof. Such permits will entitle them to day grazing only and cannot be exchanged for penta permits by paying the difference in rates.

461. *Unit of grazing.*—The entire division will form one grazing unit for which one permit for each head of cattle will be valid. This is the policy of Government expressed in their order Ms. No. 595, Development, dated 29th April 1932, and Ms. No. 802, Development, dated 11th June 1932. Where differential rates exist in the

ranges of the division permits taken at the highest prevailing rate will entitle to grazing over the entire division but permits taken out at lower prevailing rates will be valid for the range for which the permit is taken. No differential rates in the ranges of this division exist.

462. *Penning 'local cattle.'*—'Local cattle' will be entitled to be penned in the approved pentas of the range to which the village has been allotted in the above list without any additional charge in conformity with the orders of Government in their No. 244 (Press), Development, dated 15th February 1925, based on the recommendations of the Kurnool Forest Grievances Committee. Free penning licences should be issued to such cattle on the production of the grazing permits. Existing practice insists on the necessity to obtain the endorsement of the Range Officer every time the cattle shift from one penta to another. As such a procedure causes hardship on the graziers and it has been one of their standing grievances, it is prescribed that free penning licences issued by the Range Officer will be considered valid for penning in any of the approved pentas of the range, subject to the District Forest Officer's control, who will have the power to allot pentas to certain cattle, if the graziers quarrel about the matter. An endorsement to that effect should be made on all penning licences for 'local cattle.'

463. *Penning 'penta cattle.'*—Cattle which are covered by penta permits will be allowed to be penned in any of the approved pentas of the range or the division as the case may be according to the permits taken out at rates specified in the foregoing schedule; no further penning fee will be levied, nor will any fresh licence for penning be necessary. The penta rate for penning in one range only is double the ordinary grazing rate. The extra rate charged for the penta cattle is not for the privilege of penning, although it is covered by it, but for the enhanced value of the grazing provided in the pentas. In G.O. No. 1505, Revenue, dated 26th June 1915, it was declared by Government that the enhanced rate on penta cattle is for the choice areas the Nallamalais provide for grazing. Moreover, an enhanced rate on 'penta cattle' was instituted with a view to discouraging the influx of foreign cattle in order to provide greater facilities for 'local cattle.'

464. *Exchange of permits.*—With the exception of 'district cattle' which have the privilege of exchanging non-penta permits for penta permits by paying the difference in rates, no other exchange of permits will be allowed by paying the difference in rates. For instance, permits taken out at penta rates for one range only should not be made valid for the entire division by collecting the difference in rates. Cattle which are covered by 'local cattle' permits in one range should not be allowed to exchange the permits for penta permits for the neighbouring range by paying the difference between 'local cattle' rate and penta rate.

465. *Material for construction of huts and fence round pentas.*—A legitimate grievance of the graziers in the pentas has been that they are not allowed to take materials from the forest for the construction of necessary fence round the pentas and for huts for dwelling purposes. Under the recent orders of the Chief Conservator of Forests communicated in his Proceedings, Ms. No. 631, dated 1st December 1937, graziers will be permitted to collect and remove such materials as they may require for building huts and for fencing round the pentas from the reserved forests free of charge.

466. *Penta construction and sanitation.*—The cattle that come to the Nallamalais for grazing are entrusted to a class of people called Sugalis or Lambadis. During seasons of plenty of fodder, the cattle, both local and foreign, are taken to the interior pentas by the Sugalis where they are penned at nights in open places with crudely constructed fences and dwelling huts. The sanitation of penta sites is unsatisfactory; manure is allowed to accumulate with the result that flies and mosquitoes multiply in numbers. Diseased cattle are not segregated from healthy ones nor is any attention paid to such diseased cattle. In general, the Sugalis do not take particular care about the health of the cattle entrusted to them. The people themselves live in crudely constructed temporary huts under insanitary conditions. Penta construction and hygiene are matters of great importance both to the graziers and to the cattle in their charge. Suitable designs for dwelling huts for graziers, places for resting the cattle, sheds for segregating diseased cattle and pits for the storage of manure and dung far away from the penta site should be evolved and graziers should be persuaded to adhere to the specifications. Planting of fruit bearing trees should be undertaken in front of dwelling huts to provide shelter for cattle and men against sun and rain. As an inducement to the Sugalis to keep the pentas in a sanitary condition, Government in their Order Ms. No. 932, Development, dated 12th April 1939, have ordered the grant of a remission of annas four on each cow unit maintained by such of the Sugalis as keep their pentas in a sanitary condition to the satisfaction of the Forest and Veterinary departments. This applies only to the cattle owned by the Sugalis. Publicity should be given to this concession in the annual grazing notifications and also propaganda should be done by the forest subordinates.

467. *List of approved pentas.*—The following is a list of approved pentas in the division :—

Range.	Reserve.	Name of penta.	Places from which cattle come.	Nature of water-supply.	Approximate capacity of the pentas.	Measures of improvement to water-supply.	Year in which the work is to be done.	Approximate cost.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								RS.
Dornal	Cumbum	Thummagundam ..	Thimmaguram, Dornal, Katapurajapalli, Ayyanamukkula.	Thummagundam vagu (semi-perennial). Water available throughout the year in the gudem gundam.	300	....	..	..
	Do.	Medigundam	Dornal, Yedavalli, Cherlopalli and from Markapur side.	Kadithibanda sela (semi-perennial). Water available throughout the year in the gundam.	600	....	..	..
	Markapur	Talakunta	Dornal and Bommalapuram ..	Talakunta	200	This kunta should be deepened and the bund strengthened.	1944–45	100
	Eastern Nallamalais Block, 6 C.	Kurapenta	Jammi Dornal, Katapurajapalli, Thimmapuram, Cherlopalli and foreign cattle.	Narlapaya vagu. Water available from August to January.	700	A tube well may be installed here for providing water permanently.	1941–42	300
	Cumbum	Sudagula	Gantavanpalli, Dornal, Nallagunta and from old South Division.	Kumaranikunta or Ayyannakunta where there will be water for six months in the year from August to January.	600	The kunta will be deepened ..	1940–41	75
	Do.	Narlapaya	Yedavalli, Cherlopalli, Nallagunta and Chilakacherla.	Narlakunta. There will be water from August to January. Water is also available in the stream for some months.	500	Improvement to the tank	1942–43	100
	Do.	Undragundala ..	Chinna Dornal, Gudipadu, Katapurajapalli and old Kurnool South Division.	Kathaiyala madugu (semi-perennial).	1,000	Construction of a dam across the Kathaiyala madugu.	*1939–40	200
	Markapur	Kudupa	Ayyanamukkula, Gantavanpalli, Dornal, Thimmapuram and Markapur side.	Paiyala vagu or Chama vagu (semi-perennial). There will be water in the pools throughout the year.	800	....	..	..
	Do.	Nallamadugu ..	Chilakacherla, Nallagunta and Cherlopalli.	Rollapenta vagu (semi-perennial). There will be permanent pools here and there.	200	....	..	..
	Do.	Chinnangulabanda	Bommalapuram, Thimmapuram, Gantanvanpalli, Katapurajapalli and Markapur side.	Pullacheruvu kunta and Chennangula kalva (semi-perennial).	700	The cheruvu may be deepened and repaired.	1943–44	150
	Do.	Thummalabailu	Jammi Dornal, Dornal, Ayyanamukkula, Katapurajapalli, Yedavalli, Gantavanpalli and Markapur side.	Thummalabilu kunta and Yerragada sela.	1,000	The tank should be deepened. Well to be constructed both for the cattle and the gudem.	*1939–40	400
	Do.	Chinnachama ..	Dornal, Gantavanpalli, Thimmapuram, Bommalapuram and Markapur side.	Chinnachama small stream. Perennial but the flow is feeble during hot weather and sometimes dries up.	1,200	The perennial stream is diverted into a small tank which retains only a limited quantity of water. The tank should be enlarged and deepened and the course of the water flow from the spring to the tank must be made pucca so that water may be available throughout the year. This is a very important penta.	*1939–40	300
	Do.	Chintala	Jammi Dornal, Veyasaram, Bommalapuram, Thimmapuram and Edavalli.	Maddigundam and Kanakalagundam (semi-perennial). There will be water throughout the year in the gundam. In addition there is a draw and step well.	500	....	..	..
	Do.	Marripalem (proposed penta).	Bommalapuram, Jammi Dornal, Ayyanamukkula, Katapurajapalli, Thimmapuram and Markapur side.	Ralla vagu (semi-perennial) and Morasa kunta.	600	Marripalem is being provided with a draw well. Gundla sela kunta which is close to the penta should be deepened and strengthened.	1942–43	150

	Do.	Jedalapenta	Bommalapuram	(See Ganjivaripalli Range.) This penta is situated in Ganjivaripalli Range close to the common boundary between Dornal and Ganjivaripalli. Cattle from Bommalapuram which lies in Dornal Range resort to this penta as well as those from Ganjivaripalli Range villages. The penta has, therefore, been shown under both the ranges.				
Gundlakamma	Cumbum	Thungapenta	Krishnamsettipalle, Mundlapad, Kanchapalli and Nellore district.	Daddigundla vagu	900	....	..	..
	Do.	Malakondapenta	Ellupalli, Giddalur, Jayarampuram, Yengalreddipalle, Pullacheruvu, Racherla, Akavid, Sangampalle, Ankareddipalle, Mundlapad and Nellore district.	Pulichedu water hole in Thungrevu river.	800	....	..	..
	Do.	Vontiveerannapenta	Do.	Gundlakamma river (perennial), Odasikalva (semi-perennial)	800	....	..	..
	Do.	Peddanayanapenta	Achampet, Gangampalle, Yengareddipalle, Turimella.	Gundlakamma river (perennial)	500	....	..	..
Giddalur	Uyyalavada	Bodipenta	Uyyalavada, Sanjivaraopet, Gadikota, Mundlapad, Kothakota, Krishnamsettipalle, Kanchepalli and their hamlets.	Bodi vagu [perennial (stream)]	600	....	..	..
	Do.	Ragimanipenta	Do.	Enumaleru river, perennial	800	....	..	..
	Do.	Inuparatipenta	Do.	A perennial spring in Dokkalagundam vagu and Mamidigundam. (Mamidigundam consists of two gundams and contains lot of fishes).	500	Gundam is to be cleaned once in two years.	1940–41	25
	Do.	Jarripothupenta	Do.	Enumaleru river (perennial), Sandrapodu well.	2,500	Sandrapodu well is to be cleaned every year.	1940–41	10
	Do.	Pasineellapenta	Do.	Enumaleru river and a spring nearby, a furlong distant.	1,500	The spring must be cleaned once in two years.	1940–41	15
	Do.	Chintamanipenta	Do.	Enumaleru river	600	....	..	..
	Do.	Dadduvaripenta	Do.	Thadutla vagu, and a spring about two furlongs distant.	1,000	....	..	..
	Do.	Nettudupenta (proposed).	Do.	A spring about a furlong in distance.	900	The spring is to be cleaned once in two years.	1940–41	15
	Do.	Chittakonipenta (proposed).	Do.	A spring about a furlong in distance	1,000	Papuledu tank	..	..
	Do.	Pavurallamadugupenta (proposed).	Do.	Square well and a perennial stream.	1,500	Well to be cleaned every year	1940–41	15
	Veligonda North	Jillelapenta	Galijerigulla, Singasamipalle, Konapalle, Pathamallapuram, Kothamallapuram, Janapalacheruvu, Pachalavenkatapuram, Singaripalle, Gantapuram, Chennupalle, Anumayapalle, Khajeepuram, Barlakunta.	There is a sela near the penta and water remains throughout the year on Obayya sela.	300	....	..	..
Ganjivaripalli	Markapur	Panalabailu	Venkatadripalem, surrounding villages of Ganjivaripalli village, Byanbodu of Vinukonda taluk, Chandarayanipalem and Pollapalli of Markapur taluk.	Sankaragundam vagu (semi-perennial.)	600	Tube well is recommended near gudem and penta.	*1939–40	300
	Do.	Chinnagangavaram	From Palutla and Panalabailu pentas.	Chinnagangavaram stream. Water available for three months.	600	....	..	..
	Do.	Peddagangavaram	Do.	Upparathani kalva during the rainy season.	600	....	..	..
	Do.	Nekkanti	Cattle from Palutla penta	Nekkanti vagu. Perennial springs in the bed.	600	Tube well both for the penta and the gudem is recommended.	1942–43	300
	Do.	Mallagundam	Do.	Mallagundam stream	500	....	..	..
	Do.	Ghat penta	Guruzala taluk of Guntur district, Kandlakunta and Veldurti villages.	Kistna river	600	....	..	..
	Do.	Boyalakotapenta	Do.	Streams on either side of the penta.	700	....	..	..
	Do.	Kuntalapadugu	Cattle from Palutla penta	Kuntalapadugu vagu	400	....	..	..

* These works were prescribed for execution in 1939–40. If, however, they were not done in that year, it is recommended that they may be taken up in 1940–41.

Range.	Reserve.	Name of penta.	Places from which cattle come.	Nature of water-supply.	Approximate capacity of the pentas.	Measures of improvement to water-supply.	Year in which the work is to be done.	Approximate cost.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								RS.
Ganjivaripalle—*cont.*	Markapur	Yepilapenta	Guruzala taluk of Guntur district, Kandlakunta and Veldurti villages.	Kistna river	400	....	..	..
	Do.	Guttalachenu	Cattle from Guntur district ..	Bandleru (semi-perenial)	1,000	Tube well, deepening of Modalamad cheruvu is desirable.	1941–42 }	400 100
	Do.	Maddulagatta	Palutla penta cattle	Methota vagu during rainy seasons.	500	....	..	..
	Do.	Gudimetta penta ..	Kolukula, Ganjivaripalli and surrounding villages.	Gudimetta vagu, water available throughout the year except in summer.	600	No improvement is practicable ..	..	..
	Do.	Palutla	Cattle from Guntur and Nellore districts.	Bandleru stream water is available for nine months in pools.	2,000	A pucca well near the penta is to be dug in the place where an old well exists. Water-supply is essential throughout the year.	*1939–40	400
	Do.	Darabailu	Yegapalem, Ganjivaripalli and Kothapalli.	Darabailu vagu	650	Vagu is semi-perennial with water throughout the year in pools.	..	..
	Do.	Muntaluti (proposed) ..	Cattle from Daddanalapenta ..	Yetham bhavi (perennial)	400	Yethambhavi is to be deepened ..	*1939–40	150
	Do.	Telugurayanicheruvu ..	Daddanala and Pullavula Dona ..	The existing tank and the well near the tank bund.	600	Well below the tank. Bund is to be repaired by stone wall. The sluice of the tank needs repair. If it is set right the tank will contain water practically throughout the year.	*1939–40	300 for sluice, 100 for well.
	Do.	Budhotipenta	Cattle from Daddanala and Pullavuladona.	Budhotikunta water available for six months in the year and goes dry during summer.	400	Budhotikunta to be deepened ..	1940–41	100
	Do.	Morricheruvu	Kolukula, Ganjivaripalli and Gurappasala cattle.	Morricheruvu and a well near the cheruvu. Water will be available in the cheruvu for about six months and in the well for about eight months; both go dry in summer.	400	The well to be deepened and walled with stones.	1941–42	250
	Do.	Marripenta	Boyilapalli, Ganjivaripalli, Murlapalli, Ranganapalli, and Jangamvaripalli.	Kolimiseri vagu (semi-perennial) ..	550	....	..	..
	Do.	Pullavuladona	Kolukula, Gurappasala and Ganjivaripalli.	Morricheruvu and well; also Emikelarevu vagu.	400	....	..	..
	Do.	Medimanichelika ..	Guruzala taluk of Guntur district, Kandlakunta and Veldurti villages.	Stream by the side of Puttasari ..	400	....	..	..
	Do.	Madapachelama ..	Cattle from Darabailu, Bhavipenta, Suddakunta, Marripenta and foreign cattle.	Madapachelama spring and Kunta near Chelama.	400	Deepening of the existing kunta and the spring called Madapachelama.	1940–41	400
	Do.	Suddapenta	Venkatadripalem	Gandivagu (perennial)	500	....	..	..
	Do.	Peddarutla	Cattle from Pullavuladona penta.	Peddarutla vagu (perennial) ..	600		..	..
	Do.	Jangamiddela	Do.	Water from a stream which is about a furlong to the east of the penta.	400	Cattle from Pullavuladona resort to this place for a short period of one or two months during rainy season.	..	..
	Do.	Arepenta	Cattle from Marripenta and Darabailu penta.	Peddarutla vagu	300	....	..	..
	Do.	Bhavipenta	Ganjivaripalli, Venkatadripalem and surrounding villages.	Muntaluti vagu. Water is available in the vagu for six months in the year and in the springs and pools almost throughout the year.	500	....	..	..
	Do.	Jedalapenta	Cattle from Telagakunta penta and Bommalapuram.	Bayyanasela throughout the year ..	600	(See Dornal Range)	..	..
	Do.	Yelagalagunta	Cattle from Marripenta and Darabailu penta.	Water from Yelagalagunta vagu for about five months.	400	This is a shifting penta. Cattle from Marripenta and Darabailu go to this penta during rainy season for about one or two months and no improvement to water-supply is necessary.	..	..

								RS.
	Do.	Telagakunta	Gurappasala, Cheruvurayanipalem, Chinnakolukula and Peddakolukula.	Existing kunta water available for four months in the year.	300	Existing kunta to be deepened and bund improved.	1942–43	250
	Do.	Daddanala	Pedda Boyilapalli, Chinna Boyilapalli, Gudipadu, Morasapalem and Redampalli.	There is a well and kunta near the penta and another well near the old gudem site. During rainy season water is available in Ralla vagu.	650	The well near the penta dries up in summer and has to be deepened. The kunta near the penta has also to be deepened.	..	..
Turimella	Cumbum	Karakamanipenta	Krishnamsettipalle, Uppalapadu and Nellore district.	Sagileru (perennial)	1,000	....	..	..
	Do.	Jinkanaranapenta	Chiniganipalli, Akavid and Nellore district.	Talagundam, water remains for seven months.	1,000	....	..	..
	Do.	Bandlachilakapenta	Ambavaram, Jayaramapuram, Vengalreddipalle, Yellupalle and Nellore district.	Gundapaya or Jarrekulu is the nearest stream. Water remains for eight months.	500	....	..	..
	Do.	Biginepalle kunta penta.	Krishnamsettipalle. Diguvametta settlement and Nellore district.	Biginepalli kunta and step well lined with stones.	2,000	Removing silt from the kunta every alternate year.	..	10 in alternate years.
	Do.	Yerrapenta	Pullacheruvu and Achampeta	Jogapadai pools in the stream (perennial).	1,000	....	..	..
	Do.	Aremanipenta	Papinenipalli, Bollupalli, Velagalapaya, Chiniganipalle, Chollavidu, Turimella, Achampeta, Akkapalle, Madampalle, Narasareddipalle and Nellore district.	Chakramadugu vagu. Water available only for six months.	1,000	....	..	..
	Do.	Pilligundlapenta	Papinenipalli, Bollupalle and Aravetikota.	Pagapadai pools	1,000	....	..	..
	Do.	Jerripenta (proposed)	Papinenipalle and Ardavidu	Jeri in the vagu; water remains for six months.	500	....	..	..
	Eastern Nallamalais Block 1.	Juvimanipenta	Krishnamsettipalli, Ambavavaram, Jallivaripullala cheruvu, Chiniganipalle, Uppalapad, Jayaramapuram, Jayaramapuram Thanda, Vengalreddipalle, Yellupalle and Diguvametta settlement.	Utla spring perennial	1,000	....	..	..
	Do.	Yerrapadaipenta (proposed).	Ardavid, Achampet, Papinenipalli and Nellore district. Bollupalle, Gannepalle, Velagalapaya, Narayanapalle, Ankabhupalapuram, Yachavaram and Bommilingam.	Periya kunta, water remains for ten months. Papayakunta, water remains for six months. Jampaleru, water remains for six months.	2,000*	....	..	..
	Somidevipalli	Tuvvakuntapenta	Palakavid, Somidevipalli, Chinna Cumbum, Perumamilla, Lingapuram, Yerrabalem, Turimella, Anumanapalle, Anumanavidu, Obulareddipalli, Sangapeta, Jagabhalla, Krishnapuram, Govindapuram, Daraga, Hussainpuram, Madarupalle, Narasareddipalle, Goutovaram and Nellore district.	Pula sela, water available only for six months. Cumbum tank, almost perennial.	1,000	....	..	..
Markapur	Eastern Nallamalais Block 4.	Katamraju	Thippayapalem, Yamulkota, Morasmidipalli, Sivapuram, Kothapalli, Gundamcherla, Engole and Old Kurnool South Division.	Thimmalareddi bhavi (perennial) and Regula kunta.	1,000	The kunta may be deepened and repaired.	*1939–40	10
	Do.	Savakunta	Gottipadiya, Nunapalli, Gangipalli, Bodapodu and from Old South Division.	Sarvakunta (water available only during rainy season).	600	The kunta may be deepened and the bund strengthened.	1940–41	200
	Cumbum	Marlapenta	Rangapuram, Donakonda, Bommilingam, Yachavaram, Old South Division, Gannepalli and Velagapaya.	Bududaigundam or Kompaya sela. There are perennial pools in this sela.	900	....	..	..
	Do.	Erragaddasela	Sunkimula, Kalanuthala, Jarrupparapalli and Nagalavaram.	Erragaddasela. There will be water always in pools.	1,000	....	..	..

* These works were prescribed for execution in 1939–40. If, however, they were not done in that year it is recommended that they may be taken up in 1940–41.

Some of the existing pentas which were found too close to each other have been eliminated and a few new ones have been added by the Working Plans staff based on inspections of the locality and enquiry into local conditions. Pentas have been carefully chosen so as to distribute the grazing incidence as evenly as possible and also to satisfy the local requirements for penning to an optimum degree. There should be no need to add to or delete from the list any penta during the period of the plan; but if, however, such a contingency should arise, the addition or deletion will constitute a deviation requiring the sanction of proper authority. Pentas in the immediate vicinity of Chenchu gudems should be discouraged, as the cattle form a menace to cultivated crops.

The above list also shows the approximate capacity of each penta to serve more as a guide than as control and details as to the nature of the cattle that resort to the pentas, the availability of water-supply and suggested measures of improvement of water facilities wherever necessary.

468. *Pentas added and excluded.*—The following statement shows the names of the pentas excluded from the list now and those that have been newly proposed with reasons for exclusion and inclusion :—

List of pentas excluded.

Serial number and name of penta. (1)	Reasons. (2)
	DORNAL RANGE.
1 Peddachama	There are pentas close by at Chinnachama and Thummalabailu.
2 Peddamantrala (Korrapolupenta).	Peddamantrala itself is not a recognised penta but Korrapolupenta is just outside the reserve. So it has been deleted from the present list.
3 Chinnamantrala	Cattle do not usually resort to this penta. There is a Chenchu gudem at Chinnamantrala.
4 Nagulapenta	This penta is near Mogilutla within the Mogilutla Pole series. Cattle seldom resort to this penta. On silvicultural considerations the penta should be abolished.
	GANJIVARIPALLI RANGE.
5 Doddisaripenta	Recently sanctioned. It is too close to an old recognized penta at Medimanichelika.
6 Tungatipenta	The penta is in unreserve. No need to include it in our list.
	TURIMELLA RANGE.
7 Sandaramanigondipenta	Abandoned as it is near Beginepallepenta.
8 Dongapenta	Abandoned as it is near Yerrapenta.

List of newly proposed pentas.

	DORNAL RANGE.
1 Marripalem	Plenty of fodder and enough water is available.
	GIDDALUR RANGE.
2 Nettudupenta	Plenty of grazing and ample water-supply are available in these pentas for which there is a demand. The pentas do not fall within any pole series.
3 Chittakonipenta	
4 Pavurallamadugupenta	
	GANJIVARIPALLI RANGE.
5 Muntalutipenta	Water and fodder available in plenty.
	TURIMELLA RANGE.
6 Jerripenta	These pentas contain water and are necessary.
7 Yerrapadaipenta	

469. *Manure in penta sites.*—Large quantities of cattle manure are allowed to accumulate all over penta sites. Such accumulation is injurious to cattle as it is likely to serve as a source of infection and form breeding places for mosquitoes, flies and fleas, is unhealthy to the residents and detrimental to vegetation. Manure accumulating in penta sites should be removed and stored in pits about 150 yards away from the penta sites. With a view to increasing the supply of manure available to villages bordering on reserved forests for cultivation purposes, Government in their Ms. No. 778, Development, dated 25th March 1938, ordered that the removal of silt from tanks inside reserved forests and of manure from penta sites will be allowed at the rate of annas two and annas four per cart-load respectively. This will be followed in future.

470. *Precautions against cattle disease.*—In their No. 1403, Development, dated 14th June 1937, the Government ordered that cattle owners should be refused permits for grazing their cattle on the Nallamalais unless such cattle showed evidence of inoculation. Certain difficulties in getting the inoculation done either in the village or at the penta sites were adduced by the Director of Veterinary Services and Government in their Order Ms. No. 1086, Development, dated 27th April 1939, directed that the Director of Veterinary Services should at least make an attempt to take up the work as an experimental measure at a convenient penta in the forest where there may be facilities for attempting the work.

471. *Fodder grass.*—Removal of grass from the forests for *bona fide* domestic use in head-loads is now allowed free of charge. In practice, a trade in fodder grass is exercised under the guise of this concession and the department loses a legitimate source of revenue. The concession is also attendant with risks of illicit removal of timber pieces inside the grass bundles. Removals in cart-loads will, as hitherto, be allowed on permits at the rate of five annas per cart-load but it has to be recorded that the charge levied is incommensurate with the actual value of the produce. The collection and removal of fodder grass will be subject to the following further conditions :—

(*a*) No removal will be permissible from coupes under felling, from young plantations, from sandalwood propagation centres, from areas closed to grass cutting and other areas closed by the District Forest Officer for special reasons.

(*b*) Removals may be made throughout the day but they shall not be made between dusk and dawn.

(*c*) No permits will be required for head-loads but removals in cart-loads should be supported by necessary permits.

(*d*) Removals will be allowed only through recognized footpaths and roads which will be notified annually in the District Gazette.

(*e*) Areas closed to grass cutting and the conditions attendant on grass cutting and removal will be published annually along with the grazing notification in the District Gazette.

(*f*) Long grass alone may be cut. It shall not be uprooted.

(*g*) Sickles shall be used. Bill-hooks and felling-axes shall not be carried.

(*h*) No forest produce shall be felled to stiffen or tie up the bundles.

(*i*) Head-loads and cart-loads should be presented for inspection when demanded by the forest subordinates.

(*j*) The grass shall not be set on fire, either wilfully or negligently and no combustible material shall be taken into the forest; if fire breaks out the grass-cutters shall make every endeavour to extinguish it.

(*k*) The concession is liable to be terminated for serious breach of any of the conditions mentioned above or in the event of the occurrence of any serious fire, under the orders of the District Forest Officer, who shall report the fact to the Collector for approval within ten days.

472. *Closure of burnt areas.*—The twin evils of overgrazing and wilful firing of the forests have been discussed in some detail in Chapter II of Part I. An important object of management of these forests is to provide adequate pasture. Large areas are annually burnt during the hot weather mainly by graziers to promote fresh growth of grass following a shower of rain. Under controlled conditions, as provided for in a later section under 'Rotational burning,' such a measure would be in the interests of grazing, but late firing, as is done in practice by the graziers, is destructive of tree growth and impoverishes the soil due to the severity of the fires. Immediate closure of areas burnt maliciously is imperative both in the interests of the recuperation of the forests and as a deterrent on the offenders. For closure to be effective, it should be immediate if the object of wilful burning is to be frustrated. Closure for long periods is considered inadvisable as this leads to discontent and proves a serious menace to the forests due to the accumulation of dense inflammable material. Immediate closure of areas wilfully burnt for short periods is recommended. It is prescribed that in every case of fire, the District Forest Officer will consider the circumstances and decide whether closure to grazing is desirable or not; if it is desirable, he will under the powers delegated to him in G.O. Ms. No. 51, Development, dated 4th January 1940, close the area to grazing, subject to the condition that the area of the reserved forests in which the rights are suspended does not exceed 1,000 acres at a time, and that he submits a report immediately on the subject to the Collector and the Chief Conservator of Forests; if the burnt area exceeds 1,000 acres, he will with the minimum of delay, submit full particulars to the Collector and obtain his sanction to close the area for such period as may be necessary.

SECTION 3.—IMPROVEMENT OF WATERING FACILITIES.

473. *Watering facilities.*—Extensive valuable grazing grounds in the interior of the forests are not utilized to their fullest possibility due to the limitations of water-supply to cattle. Cattle rearing is an important local industry and if adequate facilities are given for grazing the possibilities of raising valuable cattle are great. There has been a steady increase in the number of cattle admitted for grazing in recent years and in the amount of revenue realized which is about half of the total revenue from the division. Therefore, an obligation exists on the part of the management to spend a reasonable amount commensurate with the revenue derived in developing the grazing

grounds. Village cattle which resort to day-grazing in the forest fringes, are watered in the village before they leave for the forests in the morning. Cattle which resort to pentas suffer most due to inadequacy of water with the result constant shifting from one penta to another is necessitated. Provided adequate water-supply is assured the cattle may remain in the pentas for a longer period. In the list of pentas given above notes have been recorded regarding the nature and availability of water in each of the approved pentas of the division, and recommendations have been made regarding improvements to existing sources and the creation of new ones, where none exist. This programme of improvement will be undertaken and carried out to the extent funds permit. The installation of tube-wells with hand-pumps in a few localities has been suggested; should this be found satisfactory its extension to other localities where present supplies are inadequate or insecure should be considered.

SECTION 4.—ROTATIONAL GRAZING.

474. *General.*—Both in the interests of grazing and forest conservancy it would be desirable to restrict grazing to the possibility of the forests but the policy of Government whereby one grazing permit is valid for an entire forest division, precludes any such restriction. Though the average incidence of grazing taken for the division as a whole is 10 acres per cow-unit, areas adjoining villages are heavily and continuously grazed by large numbers of village cattle and the present liberal policy of Government does not provide any possibility of restriction. Continuous and heavy grazing is as destructive to the more valuable species of grass as it is to the regeneration of tree species. It is therefore, imperative to devise a method whereby the ruin of valuable grazing grounds may be arrested and their maximum possibility utilized.

475. *Results of experiments.*—Experiments on " rotational grazing " conducted under organized farm conditions on a small scale have demonstrated that (*a*) *continuous* grazing with a *small* number of cattle is far more damaging to the grazing grounds than grazing by *large* numbers of cattle for *short discontinuous* periods;

(*b*) one animal for every *two* acres in the whole rotation system is considered ample;

(*c*) the length of time that any block should be grazed over is to be determined by experience. The object is that each block should be heavily and continuously grazed for a short time and thereafter be given rest for a sufficiently long time to recuperate its condition;

(*d*) provided grass is plentiful the attack on tree or seedling species by cattle is less;

(*e*) the capacity of the grazing ground is increased, the grass remains edible for a longer time and the stock improves markedly in condition.

476. *Demonstration under forest conditions.*—While the advantages of rotational grazing have been amply demonstrated under organized farm conditions, its adaptability to forest conditions is still in an experimental stage. Experiments in this direction have been started in North Coimbatore, Kollegal and North Salem divisions and the results will be watched with interest. The system aims at controlling grazing whereas the present policy of Government is directly opposed to it. The remedy lies only in educating the villagers in the benefits of this system so that they may resort to it with advantage within their own sphere of grazing. Towards this end the following experiments in " rotational grazing " will be undertaken by the department on the lines indicated. One is a large scale experiment and the other two are small demonstration centres.

477. *Rotation in time.*—Pastures will recover from the worst abuses if such malpractices are not too long continued and if they are not put into operation at precisely the same time of the year, year after year. Not only rotation in space but also rotation in time is considered essential if the pasture is to be maintained in a continuous state of productivity. The introduction of rotation in time involves complicated arrangements of paddocks; it is therefore proposed to have rotation in space only.

Large scale experiment.

478. *Choice of locality.*—The localities most suitable for the introduction of the experiments are those that are heavily and continuously grazed by cattle (e.g.), lands adjoining villages. Interior pentas are not considered suitable for the purpose as the grass is luxuriant, grazing is resorted to only during the most favourable part of the year and they are not readily accessible for inspection purposes nor are they suitable places for purposes of demonstration to the villagers. An area of about 1,200 acres in the Veligonda North reserve and its extension comprising coupes I to III felled between the years 1926 and 1930 and I to III felled between 1933 and 1936 of the Mallalamma

Agricultural Implements series in Giddalur range has been chosen for the purpose of the large scale experiment. The area is close to the hamlet of Janapalacheruvu and is shown on the detailed map of the Mallalamma Fuel Series (S.I. sheet No. 2).

479. *Capacity.*—The capacity of the rotation block is fixed at 400 cow-units. Every endeavour should be made to have this maximum number graze over the block, and, if possible, the same stock should utilize it so that any direct improvement in the stock which the system also claims to produce may be readily demonstrated to and appreciated by the owners.

480. *Paddocks.*—The block has been divided into three paddocks each consisting of two contiguous coupes. Coupes I and II felled in the years 1926–27 and 1928–29 respectively will form paddock I (area 385 acres), III and I felled in 1929–30 and 1933–34 respectively will form paddock II (area 380 acres), and coupes II and III felled in 1934–35 and 1935–36 respectively will form paddock III (area 435 acres). Cleared lines already exist showing the limits of each coupe. Hereafter it would be necessary only to maintain the limits of each paddock. Should it be considered necessary the lines dividing the paddocks may be suitably fenced.

481. *Rotation of stock.*—All cattle must graze in one paddock at a time. They may graze a paddock for a period of not exceeding one month a time. After a paddock has been vacated, it must not be grazed again for a period of at least six weeks. Within these limits cattle will move according to the condition of the pastures. The District Forest Officer will decide as to when one paddock should be closed and another opened. In the course of experience gained in any one locality it should be possible to arrive at a more or less suitable rotation. Towards this end the District Forest Officer should endeavour in the initial stages of the experiment to inspect the paddocks periodically and indicate the time when a paddock should be closed and the cattle shifted. After one or two rotations the District Forest Officer will be in a position to determine roughly the rotation to be adopted.

482. *Period of the experiment.*—The experiment will be conducted for a period of three years from April 1940 or as soon as fresh grass comes up after summer at the end of which a detailed report will be submitted to the Chief Conservator of Forests and decision taken as to its expansion or abandonment. (The experiment has already been started in 1939.)

483. *Survey of grasses.*—A detailed survey of the grasses and the tree species in the rotation block will be done before the commencement of the experiment with the help of the Systematic Botanist, Agricultural College, Coimbatore, and will be repeated thereafter every year. The most important point for observation is the ability of the better quality grasses to recuperate after grazing and also to note if non-palatable grasses increase at the expense of palatables.

484. *Control.*—The results of the survey of the grasses and the condition of the stock that utilize the block and other details will be recorded in the Control Journal.

485. *General.*—The villagers of Janapalacheruvu have given their consent orally to the Working Plans Officer to co-operate with the department in the conduct of this experiment. There are more than 400 heads of cattle in that village. As an incentive to conform to regulations half the grazing fees on the cattle that utilize the block will be refunded to the graziers at the end of the year.

Demonstration centres.

486. *Object.*—The object is to demonstrate to the ryot the advantage of controlling his cattle so as to allow a pasture time to recuperate after it has once been grazed down, by comparing it with a pasture of the same area grazed continuously by the same number of cattle.

487. *Locality.*—Two centres of 40 acres each have been chosen; one near the second mile on the Ganjivaripalli-Telugurayanicheruvu road (S.I. sheet No. 56) in Eastern Nallamalai Block 9 of Ganjivaripalli Range, and the other near the sixty-eighth mile stone on the Dornal-Peddamantrala road in Markapur reserve in Dornal Range (S.I. sheet No. 39). Both the localities are marked on the S.I. sheets Nos. 56 and 39, and have been shown to the concerned Range Officers.

488. *Layout.*—A central paddock of 20 acres will be laid out round which four sub-paddocks of 5 acres each will be formed and each of the five paddocks will be fenced with galvanized barbed wire 4 points, 2 ply by 12 B.M.G. bars, 6 inches apart for the top row and galvanized iron plain round wire 8-gauge for the bottom two rows. Access will be provided to each paddock by gates with 3 or 4 bamboo horizontals. The approximate cost of wire fencing each demonstration centre will be Rs. 600.

489. *Treatment.*—The area will come under treatment as soon as green grass becomes available after the hot weather. The experiment has already been started. At the same time, ten cow-units will be admitted into each of the central paddock and the first of the

sub-paddocks. In the central paddock the cattle will graze continuously day by day as long as the grazier in charge thinks that there is fodder. Should the cattle exhaust the grazing available, they may be removed outside the fenced area altogether and sent to graze with the ordinary village cattle. The ten cow-units admitted into the first of the sub-paddocks will remain until it has been grazed down, when they will move to the next sub-paddock and so on, the choice being left to the grazier. It is considered unnecessary to prescribe a strict programme as correct rotational grazing correlates the movement of the grazing animal with the rate of grass production which varies with the season. Should it be found necessary to remove the cattle from the central paddock through its being grazed out, the cattle from the rotational sub-paddock should also be removed and sent for ordinary grazing. Each treatment (continuous and intermittent) will then be comparable. In these demonstration areas one man should be permitted to graze all the twenty cattle free of all charge for periods fixed by the District Forest Officer on condition that he abides strictly by our rules. A daily record of the number of cattle admitted in the central paddock and in the sub-paddocks should be maintained.

490. *Inspection by District Forest Officer.*—The personal factor is important. The territorial Range Officer should inspect the centres at least twice every quarter and should report on the experiment once a quarter. The District Forest Officer should inspect each centre at least twice a year.

491. *Points for observation.*—The comparative palatability of grasses in terms of local names should be recorded. Unpalatables will be most in evidence in the central paddock. Cattle will be found to prefer certain parts of paddocks. This can be reported on by the grazier. A certain amount of information can also be gathered by the grazier as regards the capacity of various species to recover quickly from grazing in the sub-paddocks. The removal of cow-dung from the area is forbidden and the grazier in charge should break up the cakes of dung and spread them for their manurial effect all over the area.

492. *Points to be made in demonstrating to the ryots.*—Around the demonstration centre he will see the results of uncontrolled grazing. In the central paddock he will see the effect of grazing animals with an intensity of one cow to 2 acres. In the sub-paddocks he will see the effect of grazing one cow per 2 acres, but by dividing the area, each portion having been given sometime to recover after being once grazed. It will be noticed that if the experiment is conducted properly, the sub-paddocks will be superior to the central paddock.

SECTION 5.—ROTATIONAL BURNING.

493. *Grazing and burning.*—The prevalence of grazing leads to serious incidental damage, it being the commonest cause of fire in the forest. However strongly discountenanced by the department, burning of grass lands in the interests of grazing has been clandestinely practised by the graziers from time immemorial. The objects of burning the grass are :—

(*a*) To produce fresh succulent grass immediately following a preliminary shower of summer rain ;

(*b*) to destroy old culms of grass which impede the growth of fresh ones and are useless as fodder ;

(*c*) to eradicate fungi and disease-carrying bacteria and insects which collect on old grass and may be inimical to cattle ;

(*d*) lastly, in the opinion of the writer, periodical-controlled burning helps in maintaining the optimum grass-tree ratio. Existing grass flora in the areas resorted to for penning fortunately consists of desirable strains of good fodder value and any radical change in the tree canopy is likely to alter the grass complex.

Ample provision for grazing is necessary in the eastern parts of the division, notwithstanding the evils attendant on it, but indiscriminate late burning of the forests by the graziers should be put down as it is injurious both to the tree and grass species. Local opinion indicates that there has been no deterioration in the quality of the grass due to periodical burnings in the past. An area burnt in one year does not readily burn in the following year and in actual practice graziers adopt a crude method of rotational burning. If the department does not burn, the graziers will, however much we may try to put it down. In the circumstances, rotational burning of suitable grazing grounds in the interior will be done by the Department in accordance with the following prescriptions both as a measure of improving the grazing and for forestalling the graziers who would in any case set fire to the areas.

494. *Locality.*—Areas adjoining penta sites to which cattle resort only during a part of the year are considered suitable as the grass is more luxuriant. The terai portions and slopes overlooking cultivation are heavily grazed by village cattle with the result there is hardly any grass left on the area during early summer. Besides, rotational burning of such

areas would be well nigh impossible and would form a hardship on the villagers as the little grazing that may be left would be denied to their cattle. Rotational burning will, therefore, be undertaken on the plateaux of Guttalachenu and Nekkanti, which are visited by large numbers of local and foreign cattle. The area prescribed for rotational burning is about 140 square miles.

495. *Blocks.*—To each penta (cattle pen) or a group of pentas has been allotted an area of forest ordinarily grazed over by the cattle in them and is called a block. Owing to the limiting factor of water-supply, the same cattle shift from penta to penta at short intervals. This fact has been borne in mind in the formation of blocks so that, as far as practicable, all pentas resorted to by the same cattle are included in one block. Blocks have been constituted with natural features as boundaries and local names have been given to them. The following is a list of the blocks :—

1 Kuntalapadugu.	4 Panalabailu.	7 Nekkanti	10 Marri.
2 Mallagundam.	5 Palutla.	8 Darabailu.	11 Morricheruvu.
3 Guttalachenu.	6 Gangavaram.	9 Gudimetta.	12 Yelagala.

496. *Compartment.*—Each block has been divided into two compartments. Compartment lines follow as far as possible, natural features but, where artificial lines have been adopted, it is not the intention that they should be laid out on the ground.

497. *Burning cycle.*—A cycle of two years will be adopted.

498. *Method of burning.*—One compartment in each block commencing from compartment II will be burnt annually from the year 1940. Compartment I in each block was prescribed for burning in 1939 in the old Kurnool East plan by the author. Burning will be done as early in the dry weather as possible to ensure a uniform and thorough burn without serious damage to tree growth. The precise time for burning each compartment is to be determined by experience but as a general rule no burning should be undertaken after the 1st of March. Burning will be done under the immediate supervision of departmental subordinates and with the help of the graziers who resort to the pentas. If the graziers fail to assist, no burning will be done.

499. *Punitive measures.*—Should any burning of the areas included within this scheme be done in any manner otherwise than as prescribed above the penta or pentas close to the burnt area will be closed immediately for the season.

SECTION 6.—GRASS AND FODDER CENTRES.

500. *Deterioration of grazing grounds.*—Valuable grazing grounds in forest lands in the neighbourhood of villages have been ruined by indiscriminate, heavy and continuous grazing by large numbers of cattle including buffaloes and flocks of sheep with the result the areas support grass only during a fraction of the year and the cattle are compelled to resort to distant areas for day grazing. In times of scarcity of grass, trees are lopped for fodder and the tree canopy which is already very open shrinks further and the growth of grass is retarded due to desiccation of the soil. Agricultural bulls and other valuable cattle seldom resort to the reserves for grazing primarily because there is hardly any grazing in the nearer areas and secondarily due to the risk attendant on sending valuable cattle to interior forests, where carnivora like tigers and panthers form a menace to livestock. Numerous head-loads of grass are transported daily from the interior forests for stall feeding valuable cattle. Proprietors of private grazing grounds and shrotriyams which are situated close to villages charge high rates sometimes amounting to Rs. 4 per bull per annum for grazing on their lands and the more affluent of the ryots avail of this facility due to nearness and safety. Above all, soil erosion is rapidly taking place in the forest fringes and eventually a time will arrive when the reclamation of these areas will prove a difficult and expensive—if not an impossible undertaking. The creation and maintenance of grass and fodder centres should, therefore, be undertaken in localities where facilities exist with a view to reclaiming deteriorating grazing grounds and thereby relieving to some extent the distress of the agriculturists with regard to grazing their valuable cattle. Improvement measures of this kind would be more appropriate if initiated on village lands but owing to administrative difficulties it is proposed to raise these centres in forest lands.

501. *Necessity to grow leaf fodder.*—A mixed fodder of grass and tree leaves is considered a more balanced diet for the cattle. The raising of a tree crop of fodder value on these lands would therefore be desirable. A broken canopy of tree crop will, in addition to maintaining the desired variety of grass, keep it green for a longer time during summer. The optimum tree grass ratio is likely to vary with the species but for present purposes a light, broken shade should prove sufficient. In addition, tree crop would yield small firewood to the village population close to their homes besides providing shelter to the cattle that graze in the forest.

502. *Demand for land.*—Consequent on the increase of population during the last two decades and the inadequacy of cultivable lands in the villages a widespread clamour for expansion of cultivation in suitable forest lands close to villages, exists. Due to inhospitable local factors and inadequate rainfall crop productivity in village lands is low; the soil is so impoverished that it cannot stand continuous cultivation without rest for recuperation with the result a sort of rotational dry cultivation is practised. These factors have partly accentuated the demand for forest lands. The people want the land but prefer to have it on patta. Some have expressed their willingness to practise shifting cultivation on annual leases.

503. '*Kumri*'.—The ryots of a few localities have expressed their willingness to undertake 'kumri' and introduce tree crop in the first year and sow or plant up the area with grass when they relinquish it in return for the concessions to raise a field crop on the area free of assessment. Therefore, grass and fodder centres will be raised only in combination with agriculture by the local villagers. Towards this end the following general prescriptions are made but full discretion is given to the management to vary or deviate from them for sound reasons based on experience gained when the work is in progress.

504. *Choice of locality.*—The following localities have been chosen for the purpose after careful examination of the areas and detailed investigation into local conditions. The areas are shown on the stockmaps. They consist of flat or slightly undulating country with red loamy soil of moderate depth suitable for agriculture. Tree growth is negligible consisting of dwarfed specimens of thorny xerophytes with occasional scattered tree species.

List of localities.

Range.	Beat.	Reserve.	Area in acres.	Description.
(1)	(2)	(3)	(4)	(5)
1 Dornal ..	Edavalli	E.N. Block 6 A-2 and Markapur.	600	The strip of land from Mallayaswamy on the main road north-east wards.
2 Ganjivaripalli.	Gurrapasala ..	E.N. Block 8 ..	170	About one mile north-west of Gurrapasala near Kocheruvu.
3 Giddalur ..	Janapala cheruvu.	Veligonda North.	180	About one mile south-east of Janapalacheruvu near Nandireddikunta.
4 Do. ..	Ambavaram ..	Ambavaram ..	500	The area is to the west of Ambavaram-Racherla road.

The total area marked as suitable for 'kumri' is 1,450 acres. Should there be genuine demand for such 'kumri' cultivation in localities not included in the above list the District Forest Officer will have full discretion to deal with such areas on a similar basis provided they are not included in any of the working circles and felling series. If they are so included a deviation should be considered and the Conservator's orders should be obtained.

505. *Division.*—The area denoted in each locality will be surveyed and divided into blocks of 25 acres each which will again be subdivided into compartments of five acres each. At the time of selection and demarcation of the blocks pieces of land obviously unsuited to cultivation should be excluded. Normally, cultivation will be done for a period of five to six years in the first compartment. In order to provide for continuity of cultivation by the same lessee a block of 25 acres will be set apart for him so that at the end of 30 years or so when he has cultivated the last compartment he will revert to the first one. The surveyed blocks and compartments will be plotted to scale and assigned a number.

506. *Assignment.*—The Forest department may find initially difficulty in assigning the lands to dependable and deserving ryots and it is, therefore, recommended that the assistance of the local revenue officials should be sought through the Collector as they will be in a better position to deal with and dispose of applications for lands. Moreover, the average ryot has greater confidence in the revenue official than in the forest staff. Annually in the month of January applications will be called for the grant of land for cultivation from villagers close to the localities in co-operation with the revenue officials and they will be arranged in the order of merit. Emphasis is laid on the necessity to give preference to the landless and the depressed classes but at the same time claims of undeserving and undependable persons should be rejected. As many applications as there are number of blocks in the locality will be selected and to each will be assigned on annual lease free of assessment the first compartment of five acres in the block. Assignments should be completed before the end of February and the applicants should be put in possession of the lands at once after getting the necessary agreements executed.

507. *Treatment.*—The lessee will clearfell the area. All tree-growth including thorny bushes and shrubs should be felled. The lessee will be allowed to remove such material as he wants for his own domestic requirements free of charge after he has ploughed the area. The balance material will be heaped in lines 6 feet wide and 30 feet apart and the heaped material will be compacted to a height of three feet. If enough brushwood is not available

heaping will be done only on alternate lines. The heaped up material on the lines will be burnt in April. The land will be ploughed thereafter so as to fix the mineral ash in the soil and prevent its being blown or washed away. Early in June, seeds of the following species will be sown heavily in lines along the rab strips under departmental supervision. *Albizzia lebbeck, Albizzia amara, Poinciana elata, Bauhinia purpurea, Hardwickia binata, Azadirachta indica, Cassia siamea, Sapindus emarginatus, etc.* Seeds will be supplied by the department. Thereafter the lessee will be allowed to cultivate the land as in ordinary agricultural practice and for as many years as the tree crop will permit cultivation. Care should be taken not to disturb the sown lines at the time of subsequent ploughings. Seedlings should be kept free from suppression by the neighbouring field crop. Every endeavour should be made to get full stocking in the first year. The lessee should be warned that if he neglects the tree crop the lease may not be renewed. At the time of raising the last year's field crop, seeds of the following species of grass will be sown in lines six feet apart in the cultivated strips. In June following the relinquishment of the land the lessee will plough the strips and sow broadcast or plant sets of the following species of grass as directed by the Forest department :—

(1) *Sehima nervosum* (Nendra gaddi) the best local grass for cattle fodder and collected in large quantities, from the remoter forests for feeding agricultural cattle. A perennial grass somewhat difficult to establish but once established is not easy to exterminate. Sowings have been partially satisfactory but planting thick sets with a number of tillers is believed to give better results.

(2) *Panicum trypheron* (Gogadai gaddi).

(3) *Chrysopogon montanus* (Morasa gaddi).

(4) *Cynodon dactylon* (Gerichai gaddi).

(5) *Iseilma laxum* (Chengali gaddi).

(6) *Cenchrus ciliaris* (Kolukattai gaddi).

Seeds and sets of the above grasses may be collected locally except *Cenchrus ciliaris* seeds which may be obtained from the Agricultural department.

508. *Tending.*—The area sown or planted up will be closed to grazing till such time as it is considered necessary for the establishment of the grass. In the second year, a weeding consisting in the removal of undesirable strains and filling up blanks will be done departmentally. Spontaneous growth of valuable strains will be retained to form a suitable mixture.

509. *General.*—Emphasis is laid on the necessity to have close co-operation with the villagers and show sympathetic treatment so that the system which has considerable potentialities may find favour with the people. Periodical meetings between the villagers, the revenue officials and the forest officers should be convened so that matters in dispute may be settled on the spot and measures of improvement may be discussed and adopted. The lessees, who raise these grass and fodder centres, may be given some preferential treatment or a share in the produce at the time of exploitation so that they may have added incentive to work. Good-will and co-operation of all concerned are essential to the success of this scheme.

SECTION 7.—BREEDING AND IMPROVEMENT OF STOCK.

510. *Stud bulls.*—The question of the breeding of stock is a large one which cannot be dealt with fully here. It is, however, desirable that the possibilities for the improvement of the local stock should be explored. An essential requisite is ample fodder which already exists in the plateau forests of the division. The foregoing measures have been formulated with a view to developing the grazing grounds. The other requisite is the provision of suitable stud bulls. Recently, most Governments have provided for the hire or borrowing of stud bulls in village areas. The localities where stud bulls should be kept are the interior pentas, where thousands of cattle congregate during the rains, when fodder is plentiful and the cows get in heat. Some of the professional cattle breeders, Sugalis and Lambadis, keep old bulls but their efficiency is open to doubt. The maintenance of suitable stud bulls of at least good local breed in the localities of Palutla, Guttalachenu, Telugurayanicheruvu and Malakondapenta is recommended for consideration.

511. *Veterinary assistance.*—Thousands of cattle which resort to these forests for grazing hardly receive any veterinary help as the only touring assistant in the division has neither the time nor facilities for visiting and camping in remote forest areas. Cattle disease is common and seldom is veterinary assistance obtained in time to arrest its spread. The appointment of a special veterinary assistant for ensuring assistance to the penta cattle and for looking to the proper serving by the stud bulls is recommended. Much propaganda work can be done by the assistant among the graziers in the matter of improving their stock and grazing in general.

SECTION 8.—SILAGE.

512. *Composition.*—Silage is preserved fodder kept succulent by storing in air and water-tight pits. By keeping in pits fermenting processes take place converting the carbohydrates into free fatty acids and the proteins into their constituent amino acids. The effect of the free fatty acids is to stop further fermentation and the partially altered material remains in the same stage as long as the pit is kept air and water tight. Theoretically, silage can be kept indefinitely.

513. *Advantages.*—The advantages of silage over hay are :—

(*a*) The material can be stored for longer periods if properly made.

(*b*) It provides succulent fodder during dry months when cattle most need it and the forests do not support green grass.

(*c*) The food is palatable, more easily digestible and less costly than hay.

(*d*) Even coarse grasses, which cattle do not eat when green, and twigs and leaves of tree species may be converted into silage which cattle will eat.

The making of silage as an additional source of fodder for use during times of scarcity is unknown to the local villager. Silage can both be kept as a fodder reserve for use in seasons of scarcity and in years of famine and its manufacture may be undertaken as a relief measure especially in the Ceded Districts where famine is not infrequent. Departmental manufacture of silage on a large scale will be a big undertaking and it is, therefore, proposed to conduct experiments in a few localities to popularize its use.

514. *Recent experiments.*—Experiments were done in the manufacture of silage in the localities of Ganjivaripalli and Eguvacherlopalle in the year 1939. About 52 cart-loads of grass were ensiled at a cost of Rs. 100 or about Rs. 2 per cart-load, in November 1938, and the pits were opened in 1939 and the silage was distributed free to the village cattle. The silage was of good quality, the cattle ate it readily and with relish and a few villagers were impressed with the use of silage. The continuance of the experiment in a few more localities is advocated.

515. *Locality.*—The following localities are considered suitable for undertaking experiments in the manufacture of silage for demonstration to the villagers :—

Ganjivaripalli.	Peddamantrala.	Chintalapalli.	Diguvametta.
Dornal.	Chintalamudipi.	Sanjivaraopet.	Papinenipalli.

516. *Pits.*—Pits should be dug on rising ground and in places where water does not lodge. The size of the pits should preferably be 15 feet by 10 feet by 8 feet. The sides should be vertical. One pit will be dug in each locality during the month of October.

517. *Species.*—*Sehima nervosum* (Nendra gaddi) or *Heteropogon contortus* (the spear grass) will be used for making into silage. Both the species are relished in their green stage by cattle. It would be easier to demonstrate to the villagers the method of preservation of fodder with a grass of known fodder value.

518. *Grass cutting and filling.*—Mature grass will be cut in October before flowering and transported expeditiously to the pit site and stored in the pit. The pit should be well-filled in and the grass should be compacted as the filling is done. Filling will be done to a height of about three feet above ground level. The stacking of grass above ground level should be so arranged that when earth is laid on it the surface on all sides will resemble a hipped roof. The grass in the pit while it is being filled should not be exposed to the sun.

519. *Covering the pit.*—After filling, the earth around should be banked up against the sides so as to form a buttress against the piled up grass. This prevents it from bulging out. The buttress should extend two or three feet outward from the edge of the pit all round so as to make it air and water tight. Earth should be spread over the grass surface the thickness varying progressively from about one foot along the periphery to three feet at the top. When the grass shrinks due to the pressure of the earth above, more earth should be added and all cracks and crevices should be promptly filled up with earth. The surface may then be smoothened and plastered. A drain should be dug all round to drain off rain water.

520. *Quantity.*—About thirty cart-loads of grass will be required to fill up each pit. The quantity of silage prepared in each pit will be about 15 tons.

521. *Disposal of produce.*—The silage in each pit will be sold during summer either wholesale or in retail. On an average a price of Rs. 3 per cart-load of silage may be expected. The villagers pay about rupees three and annas eight for a cart-load of green grass.

522. *Cost*—

	RS.
Capital—	
Cost of digging 8 pits 15 feet × 10 feet × 8 feet at Rs. 10 each	80
Recurring—	
Cost of collecting and transporting 30 cart-loads of grass and filling up the pit at Rs. 2 per cart-load or Rs. 60 per pit	480
Revenue—	
By the sale of 120 tons of silage at Rs. 6 per ton	720

A surplus of Rs. 240 per annum may be expected. Financial return should be subordinated to the main object of this experiment which is to educate local people in the use of silage.

523. *Period of the experiment.*—The experiment will be carried out for a period of three years from 1940, on the expiry of which a detailed report will be submitted to the Chief Conservator of Forests and decision taken as to its expansion or abandonment.

524. *General.*—Large stocks of silage may be stored at Diguvametta, if the experiments are appreciated by the villagers, for sale during summer months to the neighbouring towns of Nandyal, Giddalur and Cumbum. Rail transport is readily available even to more distant places, should a demand arise.

525. *Control.*—All operations connected with the making and disposal of silage will be entered in the Record of Works and the Control Journal.

SECTION 9.—HAY-MAKING.

526. *General.*—The existence of suitable means of communication both by road and rail from the forests of the Gundlakamma Range and the large resources the interior parts of the Range have in grasses of good fodder value, render the undertaking of hay operations in the more readily accessible parts of this range a feasible proposition for supplying the townships of Giddalur, Cumbum, Nandyal, etc., and possibly also for exporting to the neighbouring districts of Guntur, Anantapur and Bellary where fodder scarcity is not infrequent. Although hay operations were conducted in the past in parts of this range as a measure of relieving fodder famine in the neighbouring districts of Bellary and Anantapur, and also for supplying the Military Depot at Bangalore, the commercial possibilities of the operations in normal seasons have not been investigated. Till regular and assured markets are secured, it is essential that the manufacture of hay should be undertaken only on an experimental scale for supply to the neighbouring villages and towns so as to popularize it. Such experimental work will be undertaken for a period of two years from 1940 at the end of which decision will be taken regarding future working.

527. *Locality.*—The area to a width of one mile on either side of the Diguvametta-Iskagundam road from the fourth milestone on the top of the ghat to the ninth milestone is considered suitable for hay operations for the following reasons :—

(*a*) The area supports abundant growth of *Heteropogon contortus* (the spear grass) and *Sehima nervosum* (Nendra gaddi) both of which are utilized for hay manufacture.

(*b*) There is no demand on this area for day grazing by village cattle and the penning that is done at Malakondapenta for short discontinuous periods is not likely to interfere with the hay operations.

(*c*) The area is conveniently situated for transport purposes and the nearest railway station, Diguvametta, is nine miles by road from the furthest point.

(*d*) Carts are available in the Diguvametta settlement for transport of the produce and plenty of labour may be obtained from the villages in the plains for the operations.

(*e*) The area includes the felled coupes in the Vedurlakonda and Malakondapenta Pole Series and the annual removal of grass will help the natural seedlings and minimize fire hazard.

The total area chosen for hay operations is 10 square miles.

528. *Yield.*—The annual yield will be 3,000 tons of hay, on the assumption, which appears to be a conservative one, that one square mile of area included will yield 300 tons. A beginning will, however, be made by making 50 tons of hay to study market conditions.

529. *Treatment.*—The following rules will be observed in the manufacture of hay :—

(*a*) Hay will be made from *Heteropogon contortus* (the spear grass) and *Sehima nervosum* (Nendra gaddi) only.

(*b*) The grass will be cut when it is in flower but before it seeds which will be in the months of September-October. Grass which has seeded becomes coarse and yields poor quality hay.

(*c*) Hay operations should be undertaken only when there is bright sunshine as rains deteriorate the quality. The south-west monsoon abates by about the middle of September and usually before the north-east monsoon commences, which is in mid-October, bright weather prevails. The period for making hay will be from about the middle of September to the middle of October.

(*d*) The cut grass will be cured into hay in bright sunshine and will be pressed into bales of 140 lb. each at site and bound with wire. Presses may be obtained from the Conservator of Forests, Bellary.

(*e*) The bales will be transported to Diguvametta for storage. The hay will be despatched to centres of consumption during seasons of demand.

530. *Cost.*—The following is a rough forecast of the cost of the operations :—

	Per ton. RS.	A.	P.
(*a*) Collecting two tons of green grass which on curing will yield one ton of hay.	5	0	0
(*b*) Curing into hay and baling into bundles of 140 lb. each and binding with wire	2	8	0
(*c*) Transport in bullock carts to Diguvametta over an average lead of 6 miles ..	2	4	0
(*d*) Royalty to the Forest Department	2	0	0
Cost of hay f.o.r. Diguvametta ..	11	12	0

The freight on a wagon load of hay is Re. 0–4–2 per mile but during years of famine a concessional rate of Re. 0–2–4 per mile was obtained. A wagon normally holds about 3½ tons of hay. It should be possible to obtain similar concessional rates during normal seasons also especially in view of the fact that the stations on the Nallamalai ghat section are not satisfactorily remunerative to the Railway Company and the authorities are, it is believed, investigating into the ways and means of augmenting the income from these stations. Adopting the concessional rate of Re. 0–2–4 per mile per wagon the rate per ton per mile works out to Re. 0–0–8. Nandyal is 30 miles from Diguvametta and Cumbum is 24 miles. The selling rate will be Rs. 13 per ton at these two places. Under full working the department stands to make a net revenue of Rs. 6,000 per annum on royalty alone.

SECTION 10.—OTHER REGULATIONS.

531. *Demarcation of closed areas.*—All areas closed to grazing will be clearly marked off on the ground by means of red sign-boards placed at as many salient points as may be necessary. Inscriptions that the areas are closed to grazing should be made on the boards in Telugu.

532. *Cattle census.*—Census of all cattle living in the villages within five miles from the reserve line should be taken annually by the beat staff to distinguish between agricultural, local, sugali, etc., cattle and to ensure that the concession in respect of ' local cattle ' is not abused.

533. *Control.*—A Control Book and a Record of Works will be maintained.

CHAPTER IX.—WORKING PLAN FOR THE MINOR FOREST PRODUCE WORKING CIRCLE.

SECTION 1.—CONSTITUTION OF THE WORKING CIRCLE AND CHARACTER OF THE VEGETATION.

534. *Constitution.*—The Minor Forest Produce Working Circle embraces the entire Kurnool East Forest Division. For administrative convenience the exploitation of minor forest products from unreserves bordering on reserved forests will be leased by the Forest department and those that do not adjoin reserves by the Revenue Department as hitherto.

535. *Kinds of produce.*—The items of minor forest produce which occur locally are :—

Cassia auriculata (tangedu) bark.
Cassia fistula (rela) bark.
Honey and wax.
Terminalia chebula (karakai) fruits.
Tamarindus indica (chinta) fruits.
Sapindus emarginatus (kunkudu) fruits.
Strychnos nux-vomica (mushti) fruits.
Buchanania latifolia (sarapappu) seeds.

Bassia latifolia (ippa) kernels.

Pongamia glabra (kanuga) kernels.

Semecarpus anacardium (marking nuts).

Bauhinia vahlii (madappa) leaves.

Diospyros melanoxylon (tumki) leaves.

Feronia elephantum (yelaga) fruits.

Phyllanthus emblica (usirikaya) fruits.

Sanseviera roxburghiana (saganara) fibre.

Gums of *Anogeissus latifolia*, *Sterculia urens*, *Pterocarpus marsupium*, etc.

Deer and sambhur horns, etc.

536. *Distribution.*—*Cassia auriculata* occurs extensively in the unreserves and in open low forests bordering on village land.

Cassia fistula occurs sparsely in mixture with superior deciduous species on higher elevations. *Terminalia chebula* occurs diffusely in the midst of superior deciduous species on higher elevations. *Tamarindus indica* is fairly abundant in the terai portions of the reserves and on the plateaux especially on sites of deserted villages, cattle pens, Chenchu gudems, stream banks, etc. *Sapindus emarginatus* is widely distributed in the Ganjivaripalli and Dornal Ranges and less so in the other ranges of the division. *Bauhinia vahlii* climber is fairly abundant in the moist deciduous forests on higher elevations in the Ranges of Gundlakamma, Dornal, Turimella and Giddalur. Other trees yielding minor forest products occur diffusely in the fuel forests on slopes overlooking cultivation. *Sterculia urens* occurs in mixture with superior timber species in the forests of Gundlakamma, Turimella and Dornal Ranges but it is not so well concentrated in the other ranges.

SECTION 2.—TREATMENT.

537. *Cassia auriculata (Tangedu) bark.*—The right to collect *Cassia auriculata* bark from the reserves and unreserves of the division will be leased once in two years commencing from 1940 for each range unit. The period of lease will be two years from the 1st of April.

538. *Cassia fistula (Rela) bark.*—The right to collect *Cassia fistula* bark will be leased on a cycle of five years, each range forming a unit of lease. The order in which the ranges will be leased will be—

(1) Gundlakamma.

(2) Giddalur.

(3) Dornal.

(4) Ganjivaripalli.

(5) Markapur and Turimella (combined).

The lease will be for a period of one year from the 1st of April. Under no circumstances will the barked wood be allowed to be removed under this lease.

Other kinds of produce.

539. *Chenchu rights.*—Under their rights of pre-emption the Chenchus are entitled to collect the following items of produce both for their domestic consumption and for sale to the Forest department or their accredited agents at rates fixed periodically by the District Forest Officer in consultation with the Collector. Such items of produce are tamarind, honey, wax, mango, myrobolams, marking nut, woodapple, ippa (*Bassia latifolia*) and madappa (*Bauhinia vahlii*) leaves. From the time of Forest settlement the rights of the Chenchus to minor forest produce have been curtailed in that they are not allowed to sell or barter the produce directly to the local 'Komatis.' A widespread clamour to revert to the old system of departmental collection or direct sale by the Chenchus to the 'Komatis' exists among them. Till the year 1928 departmental collection was undertaken, when contract enterprise, whereby the right to buy specified products from the Chenchus at scheduled rates is leased, was introduced. This system has been in force and the Chenchus are somewhat discontented as they are in the grip of the contractor and to that extent the department has lost touch with the Chenchus. While a reversion to departmental control would release the Chenchus from the hands of the contractor or the local 'Komati' to whom they are generally indebted, such a procedure is considered inexpedient at the present moment as it will involve considerable increase of staff and wide organization. The objective should be to avoid middleman's profit and distribute it among the Chenchus themselves. The Collector of Kurnool has a scheme

for introducing co-operative societies among the Chenchus and it is being developed in Kurnool West. The main object of the societies is to replace the contractor and organize collection and sale at specified depots on a co-operative basis whereby the profit will be shared by the Chenchus who will form the members of the society. It is hoped that this system will be introduced in Kurnool East as well in the near future and in the meantime it is considered unwise to revert to departmental collection as it involves erection of store houses, increase of staff and extensive organization. The rights of the Chenchus to minor forest products exist only in the Ranges of Dornal, Ganjivaripalli, Turimella and Markapur; in the other two Ranges of Giddalur and Gundlakamma there are no Chenchu settlements and no Chenchu rights exist.

540. *Honey and wax.*—The demand for pure forest honey has been on the increase in recent years, and the present system whereby the contractor collects the honey in an unhygienic manner and sells it in the local market often adulterated, is considered unsuitable. As an alternative, departmental collection should be considered both to ensure that good, pure honey is collected in the proper season and under hygienic conditions and as a check on contractor's profits. The honey will be cleaned and purified before placing it in the market. The Forest Utilization Officer should be consulted as to the disposal of the produce.

541. *Diospyros melanoxylon (Tumki) leaves.*—The leaves of *Diospyros melanoxylon* are used in the manufacture of beedies. The collection of this produce is at present included in the general lease and is left to the contractor and is attendant with the risk of damage to the trees while collecting.

542. *Other kinds of produce.*—All other kinds of minor forest produce with the exception of *gums* are included under this head. The sale will be held in the month of September as the prospective buyers will be in a position to assess the value of the tamarind crop when the tender fruits are on the trees. The period of lease will be one year from the 1st of October. The District Forest Officer will have full discretion to lease the items separately should such a procedure be productive of more revenue, and may add new items of produce to the list or delete existing items. Each range will form a unit of lease. Unreserves which adjoin reserved forests will as hitherto be included with the reserves for the purposes of the lease. In the Ranges of Dornal, Ganjivaripalli, Turimella and Markapur where Chenchu rights exist, the right to buy from the Chenchus specified items of produce at scheduled rates in localities where such rights are exercisable and the right to collect directly the items of produce in localities where Chenchu rights do not exist will be leased to a contractor in public auction. The contractor will organize the collection of the produce subject to the following stipulations:—

(*a*) Where Chenchu labour exists it will be obligatory on the part of the contractor to employ only Chenchus on collection. Any departure from this will require the written sanction of the District Forest Officer.

(*b*) Provision depots should be maintained by the contractor at suitable places indicated by the District Forest Officer and he will be bound to sell provisions to the Chenchus at rates prevailing in the nearest local market.

(*c*) The rates at which the contractor will be bound to pay the Chenchus for collections of minor forest produce made by them will be fixed by the District Forest Officer in consultation with the Collector.

(*d*) For all collections made by the Chenchus and for all payments made to them by the contractors receipts should be issued by the contractor to the Chenchus showing the kind and quantity of produce collected and the value paid for it. These receipts will be periodically checked by the Forest staff to ensure that correct payments have been made by the contractors.

(*e*) Where Chenchu labour does not exist, the contractor may employ labour from the plains.

(*f*) The contractor, his staff and coolies will be bound to assist the Forest department in case of an outbreak of fire and render all help to put it out.

543. *Sterculia urens (yerrapoliki) gum.*—The gum of ***Sterculia urens*** is commercially known as 'Gum karaiya' or 'Gum katria.' It is used for a variety of purposes some of which are listed below:—

(*a*) In the preparation of sweetmeats.

(*b*) As an adhesive in English medicines.

(*c*) By the cosmetic industry as a substitute for 'Gum Tragacant.' It forms the basis of greaseless hair cream and many of the so-called benzoin creams for the head.

(*d*) In sizing paper.

(*e*) In tooth pastes.

Local Chenchus eat the gum after soaking it in water. The demand for the gum has been on the increase in recent years. The following are the figures of export :—

Year.	Quantity exported in cwt.	Year.	Quantity exported in cwt.
1931–32	28,087	1934–35	59,291
1932–33	37,741	1935–36	
1933–34	59,172	1936–37	75,956

The exploitation of *Sterculia* gum has been found to be a commercially remunerative proposition in the Central Provinces. Recently an experiment was started in the Kurnool West Division near Indreswaram under the direction of the Forest Utilization Officer in order to find out the best method of tapping *Sterculia* trees for gum. The experiment is in progress.

544. *Proposals.*—The tapping of *Sterculia urens* for its gum will be undertaken in localities where the concentration of the trees is reasonably satisfactory. In addition to being a remunerative operation, it will provide congenial work to the Chenchus.

545. *Locality.*—*Sterculia urens* occurs diffusely scattered in the superior deciduous type of forest and it is only in the Ranges of Dornal, Gundlakamma and Turimella that the distribution of the species is fairly satisfactory. Three blocks, one near Chinnamantrala in Dornal Range, the other near Malakondapenta in Gundlakamma Range and the third near Maddipenta in Turimella Range have been selected for the exploitation of *Sterculia* gum.

546. *Analysis.*—A careful examination of the blocks was carried out and all trees of *Sterculia urens* of and above three feet in girth were located on the field maps. The position of the trees is shown on the detailed sketches accompanying this plan.

547. *Number of trees.*—The number of trees located for tapping in each block is shown below :—

Range.	Block.	Area in acres.	Number of trees.
(1	(2)	(3)	(4)
Dornal	Chinnamantrala ..	5,260	1,478
Gundlakamma	Malakondapenta ..	4,172	1,140
Turimella	Maddipenta ..	8,995	1,534

The above number is based on ocular estimate at the time of stockmapping the area; on actual enumeration more trees may be found.

548. *Tapping cycle.*—A tapping cycle of four years is adopted.

549. *Compartments.*—Each block has accordingly been divided into four compartments each containing approximately equal numbers of trees. The boundaries of the blocks and compartments follow natural features.

550. *Method of tapping.*—The following prescriptions are based on the experience gained in the conduct of the experiment at Indreswaram :—

(*a*) Tapping will be confined to sound trees of *Sterculia urens* of and above three feet in girth at breast height.

(*b*) Annually one compartment will be taken up for exploitation in serial order commencing from No. 1 except in the case of the Chinnamantrala block in which a commencement will be made with compartment 2 as the trees in compartment 1 were tapped in 1939–40.

(*c*) Early in the month of August trees in the compartment due for tapping will be serially numbered by affixing the numbers in tar on stones or boulders close to the tree.

(*d*) The trees that have been numbered will be blazed as soon as the south-west monsoon has ceased, i.e., early in September. The number of blazes that should be given to a tree will be based on the following scale :—

Trees between 3 and 4 feet in girth	One pair of blazes.
Trees between 4 and 5 feet in girth	Two pairs of blazes.
Trees above 5 feet in girth	Four pairs of blazes.

Each blaze in a pair will be directly on the opposite sides of a tree and where there are more than one pair of blazes each pair will be one foot above the lower pair.

(*e*) The blazes should be made with a sharp chisel so that the edges may be straight and clean. The blazes will be 4 inches square. The edges of the blaze should slant outwards to prevent rain water from collecting on the inner side. The blaze should extend up to the cambial layer and should be clean. The blazes may be made at a height of about two feet from the ground level.

(*f*) The blazes will be gradually extended by freshening their sides once in six or seven days systematically by taking out a thin strip of bark about 1/8 of an inch thick. More should be taken out at the sides of the blaze than at the top or bottom. No freshening should be done during the rains. When the blazes assume a size of 12 inches by 8 inches further freshening should be stopped. Between each blaze there should be at least six inches of live unimpaired bark tissue.

(*g*) New blazes should not be made within six inches of the old ones nor should the latter be opened up at the time of blazing.

551. *Method of collection.*—The exudation of gum will be slow in the early stages as the effect of the blaze would not have stimulated the tree at first. Every time a tree is visited collection of gum should be made. The production of gum will be more copious just after the rains than before it. During the rains the production will be copious although no freshening is done but the gum will be of inferior quality and dark in colour. Each season's collection should be kept separately and graded into three classes, white, red and black. The gum should be dried and stored in a dry place.

552. *Yield.*—In the Central Provinces the average yield per tree is reported to be 30 tolas and also that in more recent experiments conducted there an yield of 80 tolas per tree has been obtained. The experiment conducted at Indreshwaram has so far produced an average yield of 2½ lb. or 100 tolas per tree and there is still a good part of the season to follow. On a conservative estimate the yield may be put down at 2 lb. per tree. The total yield will be 1,038 trees × 2 lb. or 2,076 or 25 maunds per annum.

Cost.—The following table shows details of cost :—

Quality. (1)	Proportion. (2)	Cost of collection. (3)	Sale price. (4) RS. A. P.
I White	35 per cent ..	Two to two and a half annas per seer of 80 tolas.	14 5 0 per maund.
II Red	35 ,, ..	One and a half annas per seer of 80 tolas.	10 6 0 ,,
III Black	25 ,, ..	One anna per seer of 80 tolas ..	5 1 0 ,,
Waste	5 ,, ..	....	..

Cost of grading is Re. 0–2–9 per maund.

Cost of transport is one pie per maund per mile.

A net profit of about Rs. 6 per maund may be expected.

553. *General.*—Chenchu labour will be employed on all operations connected with the exploitation of *Sterculia* gum. There are no Chenchus in Gundlakamma Range except at Iskagundam where a few have recently settled down ; till more Chenchus settle down at Iskagundam plains labour may be employed for this purpose in Gundlakamma Range. Every endeavour should be made to keep the cost of collection low. Personal supervision by the superior staff will be essential in the initial stages of the work.

554. *Control.*—A register will be maintained showing the compartment number, number of trees tapped, the individual girths of the trees, the number of blazes on each tree, the dates of freshening the blazes and the total quantity of gum collected under each class and the cost of the operation. The Forest Utilization Officer, Madras, should be periodically consulted and the latest technique on tapping the trees and in the collection of gum should be obtained.

555. *Other gums.*—Other gum yielding species are *Boswellia serrata* and *glabra*, *Anogeissus latifolia*, *Odina wodier*, *Pterocarpus marsupium* and *Bombax malabaricum*. Of the above species *Anogeissus latifolia* occurs in abundance in the forests of the division but no information is available as to the method of tapping the trees and the yield obtainable. The gum of *Anogeissus latifolia* is used extensively in sizing paper and calico printing, in the preparation of dyes and sweetmeats, and as an adhesive. A wide market for the gum exists in Bombay. The Forest Utilization Officer should be consulted in the matter.

SECTION 3.—SUBSIDIARY MEASURES OF IMPROVEMENT.

556. *Regeneration of minor forest produce species.*—Tamarind, kunkudu (*Sapindus emarginatus*) and karakailu (*Terminalia chebula*) are the principal items of minor forest produce from this division. The intensive exploitation of the fruits of these species reduces considerably the chance of obtaining natural regeneration. Artificial regeneration is, therefore, necessary in order to counteract the results of exploitation. Besides, the raising of these tree species will be a remunerative undertaking. Ease of collection of the produce on the one hand and ease of inspection and control on the other point to the desirability of raising these species along road margins. In a dry district like Kurnool the presence of a few trees along the road margins would afford shade and shelter to men and cattle besides producing revenue. It is proposed to raise the species only on a small scale with the help of the staff.

557. *Locality.*—The work will be undertaken along the margins of the following roads :—

Dornal Range.—(*a*) Chintala-Peddachama. (*b*) Nallaguntla-Chinnamantrala. (*c*) Rollapenta-Peddachama. (*d*) From the 65th milestone to the 69th milestone along the Mantralakanama ghat road.

Ganjivaripalli Range.—(*e*) Ganjivaripalli-Telugurayanicheruvu. (*f*) Ganjivaripalli-Guttalachenu.

Gundlakamma Range.—(*g*) Diguvametta-Malakondapenta-Iskagundam.

Giddalur Range.—(*h*) Diguvametta-Sandrapodu

Turimella Range.—(*i*) Papinenipalli-Maddipenta.

Markapur Range.—(*j*) Chintalamudupi-Katamraju-Magatur.

558. *Treatment.*—Annually each Forest Guard whose jurisdiction includes any of the above roads either in full or in part will plant out and look after 12 seedlings of each of the following three species, *Tamarindus indica* (chinta), *Sapindus emarginatus* (kunkudu) and *Terminalia chebula* (karakailu). Planting will be done 6 feet away from the edge of the side drain and 30 feet apart on either side of the road. Planting should not be done directly under the shade of existing trees. Pits 2 feet square and one foot deep will be dug in the month of May manured if manure or burnt ash is available. The seedlings will be planted out in July immediately after a shower of rain has been received. A fence about 5 feet high will be erected round each seedling. Soil working will be done periodically. No watering will be done unless it is found absolutely essential. Casualties will be replaced during the north-east monsoon. Every endeavour should be made to promote the development of the plants so that they may be able to withstand the following hot weather. The difficulty of inducing germination of *Terminalia chebula* seeds, which has long baffled Forest Officers all over South India has been solved recently. The process consists in soaking the *seeds* in cold water for 48 hours and keeping them moist in straw out of free air circulation, otherwise called ' fermenting ' for about three weeks and sowing thereafter.

SECTION 4.—OTHER REGULATIONS.

559. *Accounts of contractors.*—The contractors will furnish monthly accounts of minor forest products removed by them to the Range Officers concerned.

560. *Control.*—A Control Book and a Record of Works will be maintained.

CHAPTER X.—WORKING PLAN FOR THE MANURE LEAF WORKING CIRCLE.

SECTION 1.—GENERAL POLICY DISCUSSED.

561. *General policy.*—The general policy of the Government with regard to the supply of green manure leaves from reserved forests has been discussed in some detail in paragraphs 223–231 of Chapter V of Part I. Government in their Order No. 652, Development, dated 2nd May 1925, reaffirmed their general policy that the ultimate aim should be the total prohibition of collection from reserves in localities where sufficient facilities for raising green manure leaves on private lands exist, and declared that they would be prepared to re-examine localities which need special treatment. They were of opinion that the district of Kurnool required special treatment due to the precariousness of the irrigation sources which impeded progress in the cultivation of manure leaves on ryots' lands. In their No. 2268, Mis., dated 20th December 1929, the Government directed that existing practice should continue and were opposed to the Chief Conservator's recommendations of replacing the ' permit system ' by the lease of annual coupes, and the introduction of total prohibition in four years' time.

562. *Revision of rates.*—Recently, the Government examined the question of revision of rates for the collection of manure leaves from reserved forests and in their No. 1802, dated 18th July 1939, considered that uniformity of rates recommended by the Chief Conservator of Forests is not so essential as a consistent policy and stated that the ideal should be total prohibition by steady and easy stages and that enhanced rates would be a means towards this end. They ordered that wherever the rate was below Rs. 1–8–0 per cart-load it was to be raised to that level and where the rate was already Rs. 2 and above no change was to be made. They were, however, pleased to allow removals in head-loads on permits at the following rates :—

Where the rate per cart-load is Rs. 1–8–0 the rate per head-load is to be Re. 0–1–3.
Where the rate per cart-load is Rs. 2 the rate per head-load is to be Re. 0–1–9.
Where the rate per cart-load is Rs. 3–2–0 the rate per head-load is to be Re. 0–2–6.

563. *The Permit System.*—The 'permit' system affords a convenient cloak for thieving, and with the limited staff available it is impossible to control the fellings; nor can any suitable measures of regeneration be undertaken in areas wherein the fellings are scattered. The evils of the 'permit' system are generally recognized and it was after a persistent and a strenuous effort that it was abolished in 1905 in respect of major produce. The perpetuation of the system in however small a measure is fraught with danger.

564. *Present rates.*—The present policy is to issue permits for collection from reserves at Rs. 2 per cart-load and at Re. 0–1–9 per head-load. The people find the rates high and economically unremunerative. The proprietors of private forests charge only Re. 0–5–0 per cart-load, but the supplies from this source are fast diminishing.

565. *Supplies from unreserves.*—Unreserves and private forests were contributing a large proportion of the demand, but owing to uncontrolled fellings in them the supplies from these sources have been fast diminishing and it is becoming an increasing necessity for the ryots to resort either to the reserves or to the remoter areas in the plains of Nellore for collection of manure leaves.

566. *Special conditions in Kurnool.*—In a district like Kurnool where agricultural conditions are primitive and irrigation sources unreliable due to precariousness of water-supply, and the people are poor and backward, the necessity for the State to provide such requisites for agriculture as the ryots cannot grow themselves at minimum cost, must be recognized. Manure leaves are used mostly for raising a second crop of paddy which, in turn, depends on seasonal rains and adequacy of water in the tanks; the raising of manure leaf crops on ryots' lands as a routine annual operation is beset with the risk of its not being utilized should the monsoon fail. Moreover there is hardly any interval between the harvesting of the first crop and the planting of the second with the result that the raising of manure leaf species on the cultivated land itself, however desirable it may be, is impracticable. Lands will have to be set apart definitely for raising manure leaf crops.

567. *Cost.*—The cost of production of a cart-load of manure leaves is not assessable with any degree of accuracy. Ordinarily a cart-load of manure leaves fetches about Rs. 3–8–0 to Rs. 4 at Cumbum.

568. *Proposals for future working.*—Future working will be based on limiting exploitation to well defined concentrated areas which contain the requisite species in reasonable abundance and in accessible situations, and wherein the undertaking of fellings will not be detrimental to the indirect benefits of forest cover. Such areas will be divided into a suitable number of annual coupes which will be designed to supply not less than the quantity exploited under the permit system in the past. Annually one coupe will be sold in public auction. No offer should be accepted which does not approximate to the figure arrived at by the product of the anticipated yield in cart-loads and prevailing seigniorage rate, after making a reasonable allowance for contractors' profit. If the coupes are not saleable, permits will be issued departmentally in accordance with the conditions specified below for the collection of manure leaves from the annual coupe at the prevailing rate of Rs. 2 per cart-load and Re. 0–1–9 per head-load. It is suggested, but not prescribed, that intensive regeneration operations be undertaken in exploited areas both as a measure of increasing the supply and to prevent deterioration of the crop and also as an object lesson to the ryots. The above measure is considered to be a suitable compromise so as to give effect to the declared policy of Government which aimed at prohibition by easy and steady stages, and also to prevent diffuse fellings all over the forests.

SECTION 2.—GENERAL CONSTITUTION OF THE CIRCLE AND CHARACTER OF THE VEGETATION.

569. *Object.*—The localities in which the demand for manure leaves from reserved forests exists are Cumbum and Markapur, where wet cultivation is practised under tank irrigation over an area of 5,000 and 1,200 acres respectively. Cultivation of a second crop is undertaken over more than one-half of the area in each locality provided water is available in the tanks. This to a large extent depends upon seasonal rains in the catchment area of the Gundlakamma. A minimum of two cart-loads of manure leaves are required for each acre cultivated. The object of this working circle is therefore to supply from the reserved forests manure leaves to the localities of Cumbum and Markapur.

570. *Constitution.*—All areas economically situated and reasonably accessible to carts in plains or slightly undulating country and containing an appreciable quantity of the species utilized as manure leaves in and around the localities of Cumbum and Markapur within reserved forests have been included in this working circle. Steep slopes have been avoided.

571. *Area.*—The area of the working circle is 3,605 acres.

572. *Character of the vegetation.*—The areas allotted to this working circle consist mostly of open scrub type of dwarfed specimens of tree growth and some shrubs. The species occurring are *Grewia rothi, Dodonoea viscosa, Ixora parviflora* and occasional *Anogeissus* or Yepi (*Hardwickia binata*). Trees of utilizable timber species seldom occur. Thorny shrubs are found scattered. Undergrowth consists invariably of grass and some shrubs.

573. *Felling series.*—The working circle is divided into two felling series which are described below. Besides these two series, one series lies alongside the Cumbum-Ongole road in Nellore Division which will also help to supply the requirements of Cumbum.

MARKAPUR RANGE.

Regatikunta manure leaf series. E.N. Block 4.

(S.I. sheet 32).

Area in acres.	Description of the series boundary.
1,700	*North.*—Starting from the junction of Chintalamudipi-Katama Raju cart road with E.N. Block 4 reserved forest line the boundary runs along the said reserved forest line. *East.*—The said reserved forest line till it meets Peddamattipaya Sela. *South.*—Up the sela till it meets Katama Raju-Chintalamudipi cart road. *West.*—The cart road to the starting point.

GIDDALUR RANGE.

Mallapuram manure leaf series. Veligonda north extension reserved forest.

(Veligonda S.I. sheet 1).

Area in acres.	Description of the series boundary.
1,905	*North.*—Starting from the north-west corner of Veligonda north extension reserved forest the boundary runs along the reserved forest line to meet Sim's line. *East.*—Sim's line to Ravurithoka Sela, down the sela to meet Mallalamma fuel series line, the Mallalamma fuel series line to meet foot-path from Malapuram passing near Mekalamani Kunta. *South.*—The foot path to meet Veligonda north extension reserved forest boundary line. *West.*—The Veligonda north extension reserved forest line to the starting point.

The felling series and coupes are shown on the stockmaps 4 inches to 1 mile. A description of the coupe boundaries is given below :—

Coupe number. (1)	Area of coupe. (2)	Selected for regeneration areas in acres. (3)	Description of coupe boundary. (4)
			MARKAPUR RANGE.
			Regatikunta manure leaf series.
I	730	116	*North.*—Starting from the junction of Chintalamudipi-Katama Raju cart road with E.N. Block 4 reserved forest line the boundary runs along the said reserved forest line. *East.*—The E.N. Block 4 reserved forest line till it meets a streamlet near 873. *South.*—Up the streamlet till it meets Katama Raju-Chintalamudipi cart road. *West.*—The said cart road to the starting point.
II	970	171	*North.*—Starting from the junction of Chintalamudipi-Katama Raju cart road with a streamlet to the south of ·873, the boundary runs down the streamlet till it meets E.N. Block 4 reserved forest line near ·873. *East.*—The said reserved forest line till it meets Peddamattipaya Sela. *South.*—Up the sela till it meets Katama Raju-Chintalamudipi cart road. *West.*—The said cart road to the starting point.
			GIDDALUR RANGE.
			Mallapuram manure leaf series.
I	955	140	*North.*—Starting from the north-west corner of Veligonda north extension reserved forest the boundary runs along the reserved forest line to meet Sim's line. *East.*—Sim's line to Ravarithoka Sela. *South.* Down the sela to Mallalamma fuel series line, the Mallalamma fuel series line to meet foot path from Salakalavidu, the foot-path to meet reserved forest boundary line. *West.*—The reserved forest boundary line to the starting point.
II	980	140	*North.*—Starting from a point on the boundary line of Veligonda north extension reserved forest at a distinct corner near ·637 the boundary runs along the reserved forest line to meet Salakalavidu foot-path near point ·711, the foot-path to Mallalamma fuel series boundary line. *East.*—Along Mallalamma fuel series line to meet foot-path from Mallapuram passing near Mekalamanikunta. *South.*—The foot-path to meet Veligonda north extension reserved forest boundary line. *West.*—The reserved forest boundary line to the starting point.

SECTION 3.—METHOD OF TREATMENT.

574. *System.*—The object of management is the production of maximum quantity of foliage suitable for manure leaves. Only twigs below the size of a man's thumb are collected for this purpose. Polarding or coppicing, as the case may be, will therefore be the system to be adopted.

575. *Choice of species.*—Under the existing system of removals on permits, the permit holder is allowed to cut and collect manure leaves of specified species only, and other valuable species are being prohibited from pollarding. Consequent on the restriction of collection to areas forming the annual coupes the ryots are likely to experience difficulties in obtaining their requirements if species are restricted. The imposition of avoidable restrictions on contractors in regard to the manner and method of felling only tends to vitiate our object to introduce contract enterprise. The areas allotted to this working circle consist of open scrub of inferior growth and trees of utility value are rare. In the circumstances it is not proposed to make any restrictions with regard to the species to be exploited. Any species occurring within the annual coupe will be considered exploitable.

576. *Felling cycle.*—A felling cycle of two years will be adopted. A period of rest following exploitation is necessary in order that the plants pollarded or coppiced may recover from the effects of pollarding. An annual felling cycle is not suitable as the trees would not have produced enough foliage or sufficiently big twigs to become exploitable in the following year. Local opinion reveals the fact that if the shoots are more than two years old, at least in respect of some of the species commonly collected, the leaves on the twigs do not stand storage for more than a few days. Whereas in the case of twigs two years and less the leaves stick to the twigs for a longer time and thus facilitate collection, storage and transport. Therefore a felling cycle of two years will be adopted.

577. *Regulation of working.*—The working will be regulated on an area basis. Each series has been divided into two coupes. On an average about one cart-load of manure leaves may be expected from three acres of forest included in this working circle. The cost of collecting one cart-load is Re. 1 and the cost of transport to Cumbum over a distance of 15 miles is Rs. 2. The selling rate at Cumbum is between Rs. 3–8–0 to Rs. 4 per cart-load. The annual output of manure leaves from this working circle will be in the neighbourhood of 600 cart-loads which is about 1/12th of the total requirements of Cumbum and Markapur.

SECTION 4.—METHOD OF EXECUTING THE FELLINGS.

578. *Agency of exploitation.*—One coupe in each series commencing with Coupe I will be sold every year in the month of June to a contractor at a rate which should approximate to the product of the anticipated yield in cart-loads and the prevailing seigniorage rate, after making a reasonable allowance for contractor's profit. Exploitation and transport will be done by the contractor. No restriction on the manner of felling or the species to be felled will be imposed except that cuts should be, as far as practicable, clean and in the case of coppicing as close to the ground as possible, and in the case of pollarding about 4 feet from ground level. The period of lease will be from the 1st of July to the 31st of January. If contract enterprise is not forthcoming permits will be issued departmentally for collection from the annual coupes at the prescribed rates of Rs. 2 per cart-load and Re. 0–1–9 per head-load.

SECTION 5.—SILVICULTURAL REGULATIONS.

579. *Regeneration.*—Regrowth from pollard or coppice shoots will be depended upon for restoring the tree canopy in felled areas. Concentrated artificial regeneration in compact areas may be undertaken to the extent funds are available. A rough guide will be to invest about half the revenue realized by the sale of manure leaf coupes on artificial regeneration and on this basis it is expected that about 3 per cent of the area of the annual coupes can be regenerated artificially. Artificial regeneration should be undertaken in the coupe immediately after felling is completed. Areas suitable for artificial regeneration in each coupe have been selected and shown on the stockmaps accompanying the plan. By the end of the period of the working plan, about 15 per cent of the area of the working circle should be regenerated.

580. *Discretion to the District Forest Officer.*—Our knowledge in the raising of manure leaf species on a concentrated basis is still obscure and the following notes are to serve as a guide to the management than as regular prescriptions. Discretion will be given to the District Forest Officer to modify regeneration operations in the light of experience gained. Every endeavour should be made to obtain full stocking in the first year.

581. *Concentrated regeneration.*—In regeneration operations of the kind noted below the two essential requisites are (*a*) a good burn and (*b*) intensive soil working. In the absence of a good burn more intensive soil working will be necessary. The land chosen for concentrated regeneration consists of fairly good soil and is nearly flat. After the completion of fellings in the coupe, the area for regeneration will be chosen from the block progressively from one end of it. A commencement may be made with five acres annually and if the results are successful the entire area marked on the map will be regenerated during the period of the plan. Strips 10 feet wide each will be laid out at a distance of 30 feet apart and the ends of the strips will be pegged out in the month of February. All available slash will be piled upon the strips to a height of 3 feet after compacting. Material from outside the area may be collected provided no green trees are felled for the purpose. The heaped material will be burnt in the month of March. No piling of slash or burning will be done to a distance of 2 feet on either side of any useful tree occurring on the strips. Immediately after the burn the soil will be worked up so as to fix the mineral ash in it and prevent its being blown or washed away. Enough material may not be available to burn all the strips. In the unburnt strips soil working will be done in the month of April–May. It may be possible to plough the strips. The possibilities of introducing " kumri " should be borne in mind and it should be introduced where conditions are suitable. Early in June seeds of the following species will be sown thickly in lines 3 feet apart along the strips. *Mundulea suberosa, Dodonæa viscosa, Calotropis gingatea, Grewia rothii, Holarrhena antidysenterica, Cassia auriculata, Tephrosia purpurea.* Resowings in failed areas will be done at reasonable intervals of about three weeks till full stocking is obtained. Besides the above, in moist localities seeds of *Pongamia glabra* may be sown. The leaf of *Poinciana elata* is considered valuable as manure leaf. The raising of this species by cuttings 6 feet long and 3 inches diameter has been found successful in Salem Circle. But there is difficulty in obtaining such large cuttings in sufficient quantities. The planting of cuttings in triangle at an espacement of 9 feet by 9 feet may be tried on a small scale. Soil working in the sown strips will be done as often as funds permit just before and just after each rain. One soil working must be done in the month of January following sowings.

582. *Deleted.*

583. *Protection of regenerated areas.*—The area regenerated will be closed to exploitation and grazing until such time as the seedlings are established and are fit for exploitation. Special demarcation of regenerated areas as a routine measure is considered unnecessary. It would suffice if the corners of the areas are indicated by wooden posts. It is recommended that a live fence of *Prosopis juliflora* (Mexican variety) may be raised round the areas. Seeds of this species can be obtained from Delhi.

584. *Grazing.*—The entire working circle with the exception of artificially regenerated areas will be open to grazing as cattle do not eat the leaves of species used for manure leaf.

585. *Control.*—A Control Book, a Record of Works and a Regeneration Ledger will be maintained.

CHAPTER XI.—MISCELLANEOUS REGULATIONS.

SECTION 1.—FIRE PROTECTION.

586. *Regional types.*—In considering the evils of forest fires a distinction has to be made between the regional types referred to in Chapter II of Part I. The submontane forests are so heavily grazed over by village cattle that there is not likely to be any inflammable material on the ground during summer. Fires seldom occur in such areas. The outer slopes overlooking the cultivation are generally heavily grazed by village cattle and annual fires are not common. Wilful firing of such areas would be detrimental to grazing interests as it would reduce the area available for grazing during summer months. Accidental fires occur occasionally but these are more often due to neglect on the part of the people using foot-paths and roads than to malicious or intentional firing. The forests on the outer slopes and the terai portions are so unimportant commercially that any attempt at rigidly protecting them from fire would be an expensive undertaking in addition to being unjustifiable. No doubt fires in these areas are to some extent destructive of the soil cover and accelerate soil erosion but the only effective way of checking intentional firing is to instil forest consciousness in the people by undertaking wide propaganda.

587. *Plateau areas.*—The plateau portions comprising about 150 square miles of forest support scattered tree growth with tall dense grass as undergrowth. The grass is periodically burnt by grazing interests. If we resist the natural instincts of the graziers the Forest department becomes unpopular with the people and they continue to

break the Forest Laws in spite of punishments and punitive measures. The demand for the periodical burning of grazing lands on the plateau is genuine and it has been shown in Chapter II of Part I how such a measure, if conducted in proper season under departmental control, would conduce to satisfy popular interests and ensure immunity from wilful late fires. Rotational burning of the grazing lands on the plateau has been prescribed in the working plan for the Grazing Working Circle and no artificial measures of fire protection need be taken on the plateau forests as the incentive to burn will be removed.

588. *Hill forests.*—The hill forests of the division occupying a narrow belt 50 miles long by about 6 miles wide along the backbone of the Nallamalais contain the most valuable timber and bamboo areas. The grass is tall and dense, and the incidence of grazing is light. The rigid protection of the hill forests is considered essential for the following reasons :—

(*a*) To protect and give a chance for the existing natural regeneration of valuable timber species to come up.

(*b*) To protect the valuable timber and bamboo forests of the division from destruction.

(*c*) Bamboo has flowered and seeded gregariously in some places and any chance ignition may result in severe destruction of tree growth and regeneration of bamboo which is coming up densly in such areas.

Fire protection measures will, therefore, be confined to the 300 square miles of hill forests.

589. *Measures prescribed.*—The system of early burning the forests as a measure of fire protection will be discontinued as it is ineffective and in several cases amounts to burning the forests late in the season. The old system of fire protection consisting in clearing and fire tracing annually important fire lines, roads and paths passing through the hill forests will be undertaken. The following prescriptions regarding fire protection are therefore made.

590. *Boundaries.*—Interdivisional, Interdistrict and Range boundaries will be fire traced annually by clearing the boundary lines to their existing width by about the middle of December, piling the cut material along the middle of the line and burning it on a quiet windless day before the 15th of January. The expenditure incurred on these operations will be debited to the annual maintenance of boundaries. A list of boundaries to be cleared and fire traced annually is given below :—

	Serial number and particulars.	Length. Miles.
1	Interdivisional boundary between Kurnool West and Kurnool East from where it crosses the Iskagundam G.B.M. road up to the Kistna river ..	* 36
2	Interdivisional boundary between Kurnool East and Guntur..	13
3	Interdistrict boundary between Nellore and Kurnool	26
4	Do. Cuddapah and Kurnool	† 23
5	Range boundary between Gundlakamma and Giddalur	10
6	Do. Gundlakamma and Turimella	38
7	Do. Turimella and Dornal	10
8	Do. Dornal and Ganjivaripalli	17
	Total ..	150

* The total length of the interdivisional boundary is 68 miles of which Kurnool East will maintain that part of the boundary from where it crosses the Iskagundam—G.B.M. road up to the Kistna river.

† The interdistrict boundary will as at present be cleared and maintained by the District Forest officer, Cuddapah North.

591. *Roads and paths.*—Fire lines already exist along most of the roads mentioned below and future operations will consist in clearing the fire lines and burning the intermediate belt before the 15th of January. Where fire lines do not exist it is not the intention that the lines should be cut but the roads should be fire traced. As regards bridle-paths a guide line 6 feet wide on the uphill side will be cut and 30 feet away from the edge of the path and the intermediate belt will be burnt before the 15th of January. As regards foot-paths two guide lines 6 feet wide each will be cut on either side of the path and 15 feet away from it and the intermediate belt will be burnt before the 15th of January. A list of roads and paths to be fire traced is given below :—

	Roads.	Length. M.	F.
1	Nallaguntla-Chinnamantrala-Maddipenta-Adutla road up to the divisional boundary	18	..
2	Sandrapodu-Diguvametta-Malakondapenta-Iskagundam-Gundlabrahmeswaram road up to the divisional boundary	28	5
3	Iskagundam-Obulesunipenta road	4	1
4	Chinnamantrala-Nallamadugupenta road	4	6
5	Dornal-Rollapenta ghat road from 67/6 milestone to the divisional boundary.	7	6
6	Rollapenta-Peddacheruvu road up to the divisional boundary	3	..

Roads.	Length. M.	F.
7 Nallamadugupenta-Peddachama road up to Kudupa penta	4	1
8 Maddipenta-Papinenipalli road up to Komativani bhavi	10	..
9 Lokki road from Aravitukota	4	4
10 Tummalapenta road	2	..
Total ..	86	7
Bridle-paths.		
1 Thummalabailu-Peddachama	2	5
2 Gudimetta-Nekkanti	11	2
3 Chinnarutla-Nekkanti	10	..
4 Obulesunipenta-Maddipenta	4	4
Total ..	28	3
Foot-paths.		
1 Namalagavi-Podolasorava	2	4
2 Jayaramareddikota-Sandrapodu	5	..
3 Sandrapodu-Papiledu up to saddle	2	..
4 Koratikanama path from Chinnamantrala-Nallamadugu road	2	6
5 Thummalabailu-Peddacheruvu up to the divisional boundary	1	6
6 Thummalabailu-Chennangulabanda penta up to the range boundary ..	2	1
7 Chintala-Peddarutla-Chinnarutla path from where it crosses the range boundary	5	3
8 Chennangula banda penta-Chinnarutla	2	6
9 Morricheruvu-Srisailam pilgrim path up to the divisional boundary	7	2
Total ..	31	4

592. *Fire lines.*—The system of fire tracing will consist in clearing guide lines 6 feet wide on either side of the line and burning the intermediate belt before the middle of January. All the fire lines are overgrown as they have not been in use for some years; therefore the cost of initial clearing may be somewhat high :—

Gundlakamma Range.	M.	F.
1 Thekulapenta	8	..
2 Paler Dam Kuruva line	3	6
3 Ragimanipenta line	3	..
4 East outer line	2	..
5 Guvvalapenta line	3	..
6 South outer boundary line	13	4
7 South catchment area fire line	6	4
8 Buggimamidi line	2	..
9 Urinarva line up to north catchment area line	3	..
10 North catchment area line	12	4
Dornal Range.		
11 Narlapaya-Nagayyakunta line from Chintakayalakuruva up to Rollapenta road	7	3
12 Kudupa fire line up to the divisional boundary from Kudupa penta	2	4
Ganjivaripalli Range.		
13 Gudimetta-Morricheruvu line	2	6
Total ..	69	7

593. *Felled coupes.*—The fire tracing of felled coupes and regeneration areas in the timber, pole, softwood and small timber working circles has been already dealt with in the respective chapters.

594. *Departmental buildings.*—All departmental buildings will be fire traced by burning a line 30 feet wide all round and 100 feet away from the building before the middle of January.

595. *Fire maps.*—Maps on 1 inch to 1 mile showing the areas burnt annually and the areas protected will be maintained.

SECTION 2.—COMMUNICATIONS AND BUILDINGS.

596. *Roads.*—The total length of existing roads maintained by the Forest Department is 175 miles.

597. *Mantralakanama road.*—The Mantralakanama Ghat road which traverses this division over a distance of 8 miles 3 furlongs is the shortest means of communication between the district headquarters and the eastern portions of the district. It serves as a main export road for the transport of forest produce from Dornal Range. It is partly metalled and partly gravelled. On an average a sum of not less than Rs. 1,000 per annum will be required to maintain this road in a state of good repair. Proper and adequate drainage is an important requisite the neglect of which resulted in the destruction of some culverts during the rains of 1937.

598. *Iskagundam road.*—The Diguvametta-Iskagundam road up to the divisional boundary is an important extraction road for the transport of forest produce such as timber, poles, small timber and bamboo from the valuable forests on the Iskagundam plateau. Most of the bamboo and timber areas on the Iskagundam plateau remain unexploited or are only partially exploited due to want of adequate road facilities. Not only should this main road be maintained in a state of good repair but the construction of a few feeder roads to the divisional boundary on the west need consideration. There are eight stream crossings in all, of which the first two from Diguvametta have got reasonably good stone pavements. The other stream crossings need attention. Commencing from Diguvametta, the first 2 miles of the road up to the foot of the ghat section are in a bad state despite large sums of money spent on annual maintenance. The next 2 miles of this road consist of a somewhat difficult ghat section which gives trouble during the rains. The traffic on this section of 4 miles from Diguvametta is comparatively heavier than over the rest of this road. It is, therefore, considered desirable to have this section of 4 miles from Diguvametta metalled progressively from 1940 at the rate of 1 mile every year commencing from the top of the ghat section. If, however, funds are not available for metalling the entire width of the road at least the wheel tracks will be metalled.

A sum of Rs. 1,200 per annum will be needed on the general maintenance of the entire length of 21 miles of this road.

599. *Obulesunipenta road (length 4 miles 1 furlong).*—The road from Perikalapenta to Obulesunipenta is another fairly important road for the transport of timber and bamboos from the Obulesunipenta series. At present no exploitation is done from the forests as they are not included in the existing plans for working. The improvement of this road will not only facilitate transport of forest produce but also will provide easy means of communication for touring officers. Annually a sum of Rs. 300 will be spent on maintaining and improving this road.

600. *Sandrapodu road (length 7 miles 5 furlongs).*—The road from Diguvametta to Sandrapodu forms an important transport road for the forest produce from the Pole and Bamboo series in Giddalur Range. A sum of Rs. 600 will be provided for the annual maintenance of this road. The road terminates at Sandrapodu and a rough cart-track exists beyond Sandrapodu up to Namalagavi up the Sagileru valley. It is prescribed that a suitable cart-road should be aligned and constructed from Sandrapodu to Namalagavi as it will open up vast bamboo areas which are at present exploited only partially. The length of the road will be about 8 miles and a rough forecast of cost of construction is Rs. 4,000.

601. *Guttalachenu road.*—The road from Ganjivaripalli to Guttalachenu is in good condition up to Regumanipenta, where it enters a gorge crossing the Gandivagu, three or four times over a short distance. This portion of the road about a mile long is difficult to keep passable for vehicles at all times of the year due to damage by sudden floods, with the result the continuation of the road to Guttalachenu has been neglected in the past. The maintenance of this road in a passable condition throughout the year will, in addition to serving as an export route for the transport of bamboos, minor forest produce and small timber from the plateau forests, render readily accessible the Guttalachenu plateau forests which at present receive little attention from inspecting officers. In addition, the possibilities of colonizing the valuable Guttalachenu plateau for agricultural pursuits would be enhanced. On a rough estimate a sum of Rs. 3,000 is considered necessary to put the road right from Regumanipenta to Guttalachenu (length 13 miles 2 furlongs). The expenditure will be spread over a period of three years from 1940.

602. *General maintenance.*—In the foregoing paragraphs roads requiring special improvements, proposals for new construction and maintenance of the more important export roads have been discussed. The remaining forest roads in the division will be maintained in a good state of repair to the extent funds permit. On an average a sum of Rs. 20 per mile length of road per annum has been provided in the financial forecast. The surface of the roads should be kept free from inflammable material. The progressive improvement of the road surface and proper drainage should be kept in view during annual repairs.

603. *General.*—A peculiar feature of the forest roads especially in the old Kurnool East Division is that they end abruptly on the boundaries of reserved forests and do not connect up with the main roads as such unconnected sections lie on village lands over which the Forest Department has no control, nor can the division afford to undertake the construction of roads on village lands as the cost of acquisition would be prohibitive. Rough cart-tracks exist connecting the forest roads and the main road, and emphasis is laid on the necessity to get in touch with the Collector and the District

Board authorities to maintain these tracks in a good state. A list of such roads is given below :—

Yerragondapalem to Ganjivaripalli.
Peddamantrala to Nallaguntla.
Mantralakanama road to Eguvacherlopalli.
Dornal to Chintalamudupi forest road.

Several cart-tracks and village roads outside the reserved forest provide ample means of communication between the forests and the villages. Some of these are motorable during dry weather.

604. *Bridle paths.*—The total length of the bridle paths in the division is 65 miles. The maintenance of these paths in a state of good repair would conduce to easy access and effective inspections. The essential items requiring attention in the maintenace of bridle paths will be their annual clearance, attention to drainage and improvement of surface. A sum of Rs. 10 per mile of bridle path has been provided in the financial forecast towards annual maintenance.

Buildings.

605. *Existing buildings.*—All departmental buildings will be kept in a state of good repair. Adequate funds must be found for the proper maintenance of buildings. The necessity to keep the surroundings of bungalows, inspection sheds, subordinates quarters, etc., always clear of vegetation both as an antimalarial measure and as a measure of protection from fire is emphasized. The provision and maintenance of a minimum of furniture requisite for each rest-house and inspection shed is prescribed. The colony at Diguvametta will be kept clear of low rank vegetation as an antimalarial measure.

606. *New constructions.*—(1) The rest-house at Rollapenta is in a bad state and it should be repaired. This will probably cost Rs. 1,000.

(2) The inspection shed at Sandrapodu is in a dilapidated condition; it should be demolished and a new inspection shed built up. A sum of Rs. 1,500 will be required for this.

607. *Wells.*—Departmental wells should be annually cleaned and kept clear of vegetation for a few yards all round. Adequate drainage should be provided to prevent water from accumulating on the ground surface.

SECTION 3.—IMPROVEMENT OF WATER FACILITIES.

608. *Existing supplies.*—The nature and quality of the water-supply to departmental buildings has been dealt with in the statement under paragraph 252. The maintenance of a wholesome and assured water-supply at forest stations conduces to the health of the staff and camping officers. Water-supply is insecure and unwholesome especially on the plateau portions

609. *Future proposals.*—A programme of improvements to existing water-supplies where necessary and the creation of new ones in places where none exist now is given below. An indication has been given as to the kind of water-supply that should be provided but full discretion will be given to the District Forest Officer to decide the best for each locality. The work will be undertaken to the extent funds permit. Proposals for the improvement of water facilities to the Chenchu gudems has also been included in this programme and necessary funds for this may possibly be appropriated from the Chenchu budget :—

Number and locality. (1)	Reasons. (2)	Proposals. (3)	Approximate cost. (4)
		Dornal Range.	RS.
1 Rollapenta	The present water-supply from the well is not wholesome and is inadequate.	Deepen the existing well and protect and improve the spring in the stream bed.	100
2 Peddachama	Water from the spring comes in an open channel and is not assured. It is open to contamination.	Improve the spring, lay out a good channel or pipe line. Draw well in addition is recommended.	600 1,000
3 Thummalabailu ..	Big gudem. Present water supply is insecure.	Deepen and construct a draw well in the place where a trial pit was dug.	30
		Gundlakamma Range.	
4 Obulesunipenta ..	Present water-supply is a spring in the bed of the stream. It is open to contamination.	Clean the spring and protect it ..	100
5 Iskagundam	A tube well has been sunk ..	A hand pump is required	150
		Ganjivaripalli Range.	
6 Guttalachenu ..	Water in the stream bed is insecure and open to contamination.	Install bore well or improve old well.	30
7 Palutla	Big gudem and Lambadi settlement without proper water-supply.	Proposals already made under water-supply to pentas.	..

SECTION 4.—AMELIORATION OF THE CONDITION OF THE CHENCHUS.

610. *Chenchu schools.*—Considerable sums of money are spent annually by the Government on imparting elementary education to Chenchu boys and girls as a measure of enlisting the co-operation of the younger generation when they grow up. By nature and habit, the Chenchu is lazy, dull and leathargic and is readily susceptible to criminal and sensuous propensities. When a boy attains the age of seventeen he must get married by custom. The little education he received during his boyhood does not benefit the community but on the other hand creates in the boy desires for things he cannot afford and dispels the little interest he may have had in manual labour. He seeks after comfort and employment which will bring him pay without work. While the present system of education cannot be said to have been a wasted effort, it would have been more beneficial if an agricultural or technical bent had been given to the education. The introduction of handicrafts in the Chenchu schools recently inaugurated by the Collector has met with a certain amount of ready response and success and the prospects of their expansion in the future appear promising. Chenchu boys and girls in the schools are taught to make plate leaves, bamboo and date mats, bamboo baskets, etc., which are sold in the local markets. In addition, in every school centre a plot of land is devoted to the purpose of teaching the pupils in the art of cultivation of field crops and raising vegetable and flower gardens. Every day the boys and girls put in a certain amount of manual labour and they appear to take a delight in doing it. A proposal to send specially selected boys to Atmakur for training in carpentry, smithy, etc., is under contemplation with a view to fitting them to walks in life which would be beneficial to the Chenchu community. All these are developments in the right direction and it is emphasized that the policy of the schools should be so oriented as to make the Chenchu boys and girls fit for earning their livelihood in the gudem itself when they come out of the schools in addition to receiving the routine elementary education.

611. *Chenchu cultivation.*—The reclamation of the Chenchu from his nomadic and vicious habits lies, in the opinion of the writer, in making him take to intensive cultivation. The Chenchu does not claim to know agricultural practice himself and he invariably invokes the help of a local ryot who does the cultivation on a crop sharing basis. If the Chenchu is to be made to take to agriculture, he should not only be persuaded but compelled to do it himself under the supervision of the departmental staff. Under the regeneration measures prescribed in the Small Timber Working Circle departmental kumri in six localities near Chenchu gudems will get the benefit of the agricultural demonstration but in others similar work or pure agriculture should be started in the vicinity of the gudems. The replacement of Chenchu headmen by plainsmen knowing agriculture, with a view to assisting the Chenchu in cultivation and putting him in the way has been introduced this year as an experimental measure in a few gudems; already the scheme holds out promise of success. The plainsmen will be kept in the gudems till the Chenchus have learnt cultivation. Foresters in charge of gudems will be made to take a short course in agriculture at the Nandyal farm with special reference to the conditions prevailing in their respective gudems. The Collector has an idea of sending out one or two suitable Chenchu boys to go and work with the agriculturists in the plains to learn cultivation for a season or two. The boys when they return to their gudems will, it is hoped, prove useful in organizing and teaching cultivation to the others. In addition to cultivation by individual Chenchus, collective cultivation on a common piece of land for the gudem as a whole has been recently introduced in one or two localities in Kurnool West. This has received a certain amount of ready response from the Chenchus. In localities where water is available for irrigation purposes the raising of fruit-trees and paddy should be considered. Areas suitable for cultivation in the vicinity of Chenchu gudems have been indicated on the stockmaps and every endeavour should be made by the Forest staff to persuade the Chenchus to cultivate the lands under this supervision. No restriction need be made on the extent of land cultivated by the Chenchus provided the area cultivated is covered by a proper lease granted by the District Forest Officer and the cultivation is done by them. Under no circumstances should the plainsmen be invoked to assist the Chenchus in cultivation otherwise than as mentioned above. Adequate advances should be made to the Chenchus for the purchase of bulls for ploughing.

612. *Chenchu cattle.*—The Chenchus are allowed to keep and graze their cattle free of charge subject to a maximum number allowed at the time of settlement for each gudem. Any progressive increase in the number of cattle owned by the Chenchus consequent on expansion of cultivation need not be discouraged. Permits, free of charge, should be issued to such cattle annually. Chenchus of some gudems act as graziers for local and foreign cattle and every encouragement should be given to develop this activity as it is a lucrative one.

615. *Post of the Assistant Chenchu officer*.—The post of the Assistant Chenchu Officer appears to be superfluous and does not lead to harmonious working with the territorial staff. All works in connexion with the amelioration of the condition of the Chenchus are best carried out by the local forest staff who are in direct contact with them and the necessity for an intermediate officer between the Range Officer and the District Forest Officer has only led to neglect in the past. The permanent abolition of the post of the Assistant Chenchu Officer is strongly recommended. A commencement has already been made by keeping the post in abeyance for one year to see if it leads to smoother working, and interim results justify our expectations.

616. *General*.—Chenchu labour should be employed on all works done either departmentally or on contract as long as the Chenchus are capable of doing such works. The local staff should take active interest in seeing that the gudems are kept clean and sanitary and that the Chenchus are treated with kindness and goodwill without loss of discipline and control.

SECTION 5.—LAND FOR CULTIVATION FROM RESERVED FORESTS.

617. *Demand for land*.—The agricultural population in the vicinity of forest areas has been agitating for the disreservation of cultivable lands from reserved forests bordering on village land for expansion of cultivation. The demand is keen due to the following reasons :—

(1) The return from land in the Markapur taluk is low owing to inhospitable local factors and precarious rainfall with the result that larger areas have to be cultivated to make individual holdings economic.
(2) Cultivable land in the unreserves is limited and in some cases is exhausted.
(3) Rotational cultivation is practised as the soil cannot support a continuous crop unless heavily manured.
(4) In the last two decades, the population has increased by about 12 per cent.
(5) Markapur taluk is notorious for its poverty; the wage earned by an ordinary labourer is 2 annas 6 pies per day. A genuine urge, especially from the backward classes and the landless few, for taking to independent cultivation, prevails.

618. *Area*.—The total area suitable for agriculture in the reserved forests bordering on village land is estimated to be 1,450 acres.

619. *Discussion*.—The lands are characterised by open thorny scrub type of forest consisting of dwarfed specimens of thorny xerophytes with a sprinkling of tree species generally unsound, gnarled and stag headed. Continuous and excessive grazing aggravated by the stealthy inroads of man for satisfying his requirements of small timber, fuel and leaves for fodder and manure, have nearly completed the ruin of these forest lands with the result they are neither useful to the department nor to the ryot, except to the extent the scattered scrub growth helps in preventing accelerated erosion. Disforestation of these areas would result in accelerating the work of destruction and the bare hill sides adjoining Cumbum and Giddalur are standing monuments of the misuse of land. The lands should therefore be retained under the control of the Forest department with a view not only to conserving what is left behind but also to provide grazing for the large numbers of cattle in the village and, if possible, to develop them in the interests of grazing. At the same time, demand for expansion of cultivation is also recognized. The raising of tree and grass crops in combination with agriculture would, therefore, be the only method of restoring these lands to a state of productivity so as to be useful to the local agricultural population. In addition to providing land for expansion of cultivation, valuable pasture lands will be created when the lands are relinquished. Under the working plan for the ' Grazing Working Circle ' proposals have been made under section 6 for the raising of grass and fodder centres in combination with agriculture on such lands. If this proposal results in success, the possibilities of introducing the system over the entire forest fringes are considerable.

620. *Prescriptions*.—No disforestation of forest lands will therefore be proposed until the results of the scheme for raising grass centres are known. Areas suitable for raising grass centres in combination with agriculture are shown on the stockmaps 4 inches=1 mile.

SECTION 6.—CHARCOAL MANUFACTURE.

621. *General*.—The forests bordering on village lands contain such poor growth of tree species that they will not lend themselves to the manufacture of charcoal on a commercial and remunerative basis. The local demand for charcoal is small but a fairly wide market for it exists in the neighbouring district of Guntur. Recently there was an enquiry from the Chief Conservator of Forests, in his No. 3430/38-E, dated 23rd April 1938, on the possibilities of making charcoal briquettes for motor power. An

area of about 3,000 acres in the interior forests on either side of the road from Ganjivaripalli to Telugurayanicheruvu in Ganjivaripalli Range is fit to be exploited for the manufacture of charcoal on a commercial basis. The crop consists of scattered *Hardwickia binata* with its usual associates of inferior deciduous species. The canopy is open and the stocking is sparse. The slopes are in places steep wherein regeneration operations would be a difficult undertaking. Unless felled areas can be successfully regenerated with useful tree species, it would be unwise to fell extensive areas, especially in a dry district like Kurnool, where the retention of forest cover is more important for the indirect benefits it confers. Large scale operations may be undertaken if the making of charcoal briquettes becomes an accomplished fact and if felled areas can be satisfactorily regenerated. The desirability of starting the manufacture of charcoal on a small scale as a measure of initiating the staff in the process of manufacture and in regeneration measures under the 'Kumri' method is recognized and towards this end the following prescriptions are made.

622. *Locality.*—An area of 300 acres in the forests adjoining the Allipalem Chenchu gudem has been selected for felling and conversion into charcoal during the period of this plan. The area has been divided into ten coupes of which coupe I has been taken up for exploitation in 1939–40. The area selected is in parts suitable for kumri cultivation. Ample Chenchu labour is available in the Allipalem gudem and kumri practice would offer the Chenchus field for learning cultivation.

623. *Treatment.*—Annually one coupe will be taken up for felling in the serial order shown on the detailed map. The coupe will be clearfelled and the material will be converted into charcoal in over ground paraboloidal kilns and the produce will be marketed in Markapur, Narasaraopet of Guntur. Every endeavour should be made to produce first-class charcoal of as fairly big a size as possible at cheap cost. Details of charcoal manufacture are well known to Forest Officers and they need not be repeated here. Chenchu labour should be employed on all operations connected with charcoal manufacture except in the initial stages when one or two experts from outside may be employed to assist the Chenchus.

624. *Regeneration.*—Such portions of the coupes as are fit for cultivation will be kumried and tree crops will be raised along lines 22 feet apart. Seeds of deciduous fuel species will be sown early in June. For details please see the regeneration prescriptions under the 'Small Timber Working Circle.'

625. *General.*—Felled areas will be closed to grazing for a period of four years from the year of felling. Regenerated areas will be fire traced by cutting 2 guide lines 6 feet wide each and burning a central belt of 18 feet all along the periphery for 4 years from the year of regeneration.

626. *Control.*—A Control Book and a Regeneration Ledger will be maintained.

627. *Cost.*—The cost of manufacture of charcoal at site is estimated to be 4 annas per bag of 70 lb. The cost of transport to Markapur is 3 annas per bag. The net profit will be 4 annas per bag. On an average an acre of forest felled will yield about 1·2 tons or 38 bags of charcoal.

SECTION 7.—TREE-PLANTING.

628. *Tree-planting.*—Increased interest is being evinced by villagers and district officials in the necessity for planting trees of utility species on village and private lands to communal or individual benefit, and the observance of a tree planting week every year is becoming a regular feature in every district. The intimate co-operation of the Forest department will be an essential requisite for success. It is, therefore, prescribed that suitable permanent nurseries will be maintained at the following stations :—

Diguvametta, Markapur, Ganjivaripalli, Papinenipalli, Dornal and Peddamantrala and seedlings of the following species should be raised for distribution to the villagers.

Tamarind, mango, *Albizzia lebbeck*, *Azadirachta indica*, *Pongamia glabra*, *Poinciana elata*, *Sapindus emarginatus*, etc.

The necessity for propaganda among the villagers to arouse forest consciousness in them and to persuade them to plant trees of useful species on their own lands is emphasized.

SECTION 8.—TEAK PLANTATIONS.

629. The remnants of the teak plantations at Peddachama, Peddamantrala and Maddipenta were thinned in the years 1932, 1937 and (?) respectively and no further thinning would be desirable nor necessary during the period of this plan. The plantations are nearly 30 years old and when they attain the age of 40, i.e., at the time of the revision of this working plan, the plantations may be considered mature for felling. The factors of the locality indicate that there would be a fall of increment after 40 years of age, and medium sized teak trees fetch remunerative prices in Kurnool. During the period of this plan 20 dominant trees will be selected in each of the three plantations and their girth at breast height will be measured every year to find out their rate of increment. The trees in the plantations will be freed from climbers by the beat staff. Minor teak

plantations extending over 2 to 5 acres exist near Sandrapodu, Diguvametta, Malakondapenta and Iskagundam. These will require thinnings and tending during the period of the plan. As a general rule thinning and tending will be done in all the plantations as necessity arises.

SECTION 9.—THORN AND FUEL.

630. *Thorn and fuel.*—The existing practice of allowing collection of thorns from reserves on permits at five annas per cart-load will be discontinued as it leads to corruption loss of revenue to the State and destruction of forest cover. The authority for imposing the fee of 5 annas per cart-load could not be traced out. The demand for thorns is spasmodic, and that for forest firewood is negligible as the ordinary villager is averse from paying for fuel. The formation of regular series and coupes for supply of thorns and firewood to the agricultural population is ruled out as impracticable due to lack of sustained demand, the scattered nature of the demand, every ryot wanting the material close to his holding, and the apathy on the part of the villagers to take coupes. Experimental thorn coupes have proved a failure. Villagers and anxious to continue the ' permit system ' but this should be stoutly opposed. Full discretion will be given to the District Forest Officer to constitute and sell small coupes of not less than 5 acres in any one locality in reserves bordering on village lands and not included in any of the felling series, as and when demand for thorns and fuel arises. Wide publicity should be given to this provision in the villages close to reserves and every endeavour should be made to dispose of applications for such coupes expeditiously. The period of lease should be a short one. Felled coupes will not be closed to grazing.

SECTION 10.—BOUNDARIES.

631. *Boundaries.*—The clearing and maintenance of reserved forest boundaries will form one of the legitimate duties of the local beat staff. Special provision has, however, been made under the section ' Fire protection ' for the annual clearance and maintenance of the interdistrict, interdivisional and range boundaries under sanctioned estimates. The interdivisional boundary between Kurnool West and East from its southernmost point to where it crosses the Iskagundam-Gundlabrahmaswaram road will be maintained by the District Forest Officer, Kurnool West; the balance of it up to the Kistna river will be maintained by the District Forest Officer, Kurnool East. The interdivisional boundary between Guntur and Kurnool East will be maintained by this division. The interdistrict boundary between Kurnool and Nellore along the Veligondas will be maintained by this division. The interdistrict boundary between Cuddapah and Kurnool will be maintained, as at present, by the District Forest Officer, Cuddapah North.

SECTION 11.—RAIN GAUGE.

632. *Raingauge* stations are maintained by the Forest department at the following stations; Rollapenta, Peddamantrala, Eguvacherlopalli, Iskagundam, Diguvametta, Sandrapodu, Nekkanti, Telugurayanicheruvu and Maddipenta. Measurements should be recorded on every morning following a rainy day and the rainfall recorded should be promptly communicated to the District Forest Officer in addition to the usual monthly consolidated statements as a knowledge of the number of rainy days in a month is useful in undertaking regeneration operations.

SECTION 12.—SANDAL.

633. *Sandal.*—No new sandal propagation centres will be created. A list of existing sandal propagation centres in each range is given under paragraph 242. In addition, natural sandal occurs in the localities of Diguvametta in Gundlakamma Range and in Chennangulabanda penta in Dornal Range. All existing sandal trees, saplings and seedlings will be suitably tended under the supervision of the Range Officer as necessity arises. No possible host should be cut down. The heads of the sandal plants should be kept free from overhead cover. Climbers and creepers on sandal should be cut and removed.

SECTION 13.—PETTY FELLINGS.

634. *Petty fellings.*—Full discretion will be given to the District Forest Officer to allow petty fellings for departmental works, duly authorized free grants to people, etc., in areas outside the coupes and series constituted under this working plan. Emphasis is laid on the necessity to localize such fellings and ensure that the stumps are hammer-marked at the time of removal of the produce. Such fellings will not constitute a deviation from the working plan requiring administrative sanction.

SECTION 14.—PALMYRA WORKING.

635. *Palmyra working.*—Palmyra trees occur in fair concentration in the Mundlapad reserve of Giddalur Range. Under Mr. Sundaram's Working Plan a separate working circle was constituted for the exploitation of palmyra trees on a selection basis on a five-year felling cycle. Exploitation was to be confined to trees of and above 50 feet in height. There was no demand for the trees during the period of the plan. Should a demand for the palmyra trees from reserved forests arise in the future the District Forest Officer will select and mark in advance as many *mature* trees as there is a demand for and sell them in auction. No regeneration measures will be undertaken.

SECTION 15.—RED SANDERS.

636. *Red sanders.*—Red sanders occurs in fair profusion over an area of about 5,000 acres in the southern portion of the Veligonda reserves and in parts of Giddalur Blocks I and II bordering on the Cuddapah district. The distribution of red sanders is shown on the stock maps. The crop is too immature at present to allow of exploitation but the possibility of exploiting these areas should be considered at the time of revision of the plan. Red sanders occurs in mixture with *Anogeissus latifolia, Boswellia glabra, Terminalia tomentosa, Chloroxylon swietenia,* etc., on fairly steep slopes and in open stands. Trees of and above 18 inches in girth are rare. Natural regeneration is satisfactory in favourable localities.

SECTION 16.—PRESERVATION PLOTS.

637. Sample plots numbers 25 and 27 in the Iskagundam plateau in Gundlakamma Range will be maintained as preservation plots. No fellings of any kind should be allowed in these plots (vide Provincial Silviculturist's Ref. R.O.C. No. 89/40-FNCL., dated 11th January 1940). The *Diospyros melanoxylon* tree near Maddipenta rest-house will be treated as a protected tree.

SECTION 17.—CONTROL.

638. *General.*—The various control records to be maintained have been noted under each working circle. The posting and maintenance of control records should receive the personal scrutiny of the District Forest Officer. The necessity to obtain accurate figures of outturn when the agency of exploitation is contractors is emphasized, as these figures form the basis for the Control Book. Every operation prescribed in the working plan should find a place in the Record of Works. The proper maintenance and posting of Control maps showing the limits of the areas exploited has not received the attention it requires. Areas exploited should be shown in a distinctive colour and the coupe number, year of felling and area in acres should be noted against each coupe in the Control map. Existing control forms would suffice. No new forms are prescribed.

639. *Register of deviations.*—A register of deviations will be maintained showing every case of deviation from the prescriptions of the working plan, the necessity for the deviation and the authority in support of the deviation. This is an important record, the non-maintenance of which has led to considerable confusion in the former plans.

640. *Control Journal.*—A Control Journal will be maintained and separate pages will be allotted to each working circle. The object of the Control Journal is to secure a running commentary on all aspects of administration especially with regard to the extent to which the prescriptions and the object of the working plan have been carried out and realized. All observations recorded by the District Forest Officer would be of use at the time of revision of the plan. It is recommended that the District Forest Officer should take this journal into camp and record suitable notes as opportunities occur.

CHAPTER XII.—ESTABLISHMENT AND LABOUR.

SECTION 1.—ESTABLISHMENT.

641. *Establishment.*—The strength of the existing establishment is adequate to carry out the prescriptions of this working plan; and some reduction is possible in the strength of the foresters. Out of a sanctioned strength of 20 foresters for the division the present strength is only 16 which is considered sufficient. The distribution of foresters will be as follows :—

Range (1)	Number of foresters. (2)	Localities. (3)
Dornal	4	Chinnamantrala. Peddamantrala. Peddachama. Eguvacherlopalli.

Note.—At present there are two foresters for the Chintala and Peddachama gudems but one forester for both should suffice.

Gundlakamma	3	Iskagundam. Malakondapenta. Diguvametta.
Giddalur	4	Sandrapodu. Sanjivaraopet. Chintalapalle. Galjerigulla.
Ganjivaripalli	2	Telugurayanicheruvu. Guttalachenu.
Turimella	2	Papinenipalli. Maddipenta.
Markapur	1	Chintalamudipi.

SECTION 2.—LABOUR.

642. *Labour.*—Ample Chenchu labour is available in the Ranges of Dornal, Ganjivaripalli, Turimella and Markapur to carry out the prescriptions of this working plan. Although there are no Chenchus in Giddalur Range plains labour is available in large numbers for carrying out departmental works. The Gundlakamma Range offers difficulties in regard to labour. Increased exploitation of timber and bamboo will be undertaken under this plan involving the employment of a large amount of labour. In addition, the range has got important road works, fire protection operations, and regeneration measures. Plains labour, besides being expensive, is not readily available as the people are afraid of the unhealthiness of the interior parts of this range. Nine Chenchu families have recently settled down at Iskagundam and emphasis is laid on the necessity to persuade some Chenchus from the gudems of Maddipenta and Abrajakunta to settle down at Iskagundam. The settlement at Diguvametta has about 30 cartmen who mainly depend on the transport of forest produce from the plateau forests to the plains. Annual licences are granted to the residents in the settlement and certain concessions in respect of free grazing for one pair of bulls and two cows or buffaloes are shown to the cartmen in the settlement. The existing arrangements may be continued.

CHAPTER XIII.—FINANCIAL FORECAST AND COST OF THE WORKING PLAN.

SECTION 1.—FINANCIAL FORECAST.

643. *Statements.*—The following statements show the financial aspect of working—

(*a*) the estimated revenue and expenditure during the period of the plan,

(*b*) an abstract of the forecast,

(*c*) comparative statement showing the actual revenue and expenditure during the three-year period ending 1938 with the forecast.

644. *Revenue.*—The gross average annual revenue is estimated to be Rs. 76,800 as against the average of Rs. 85,132 for the three-year period ending 1938. The fall in revenue is chiefly due to the reduction of the grazing fees. An analysis of the gross revenue shows the distribution under the following major heads :—

	PER CENT.		PER CENT.
Grazing	40	Bamboo	11
Timber	17	Minor forest produce	9
Miscellaneous	19	Fuel	4

Grazing provides two-fifths of the revenue derived from the division. Though the grazing fees were reduced by 50 per cent in 1938 the revenue realized during 1938–39 was about 70 per cent of the average derived in the past owing to the fact that larger numbers of cattle took out permits consequent on the reduction of fees. It is not unlikely that in course of time the revenue realized from grazing will equal the average in the past before reduction. The forecast of revenue from bamboo has been based on the average realization in the past but due to more intensive working the revenue from this source is likely to appreciate in the future. Consequent on the flowering of the bamboos gregariously in some localities the revenue from this source may be somewhat low in the next few years but thereafter it is likely to increase appreciably.

645. *Expenditure.*—The anticipated average annual expenditure is Rs. 82,900 as against the average of Rs. 1,01,811 for the three-year period ending 1938. The reduction in the forecast figure is due to measures of retrenchment and economies suggested under establishment. The expenditure includes the cost of the Chenchu budget also. The anticipated expenditure is classified below :—

	PER CENT.		PER CENT.
Establishment	74	Exploitation	3
Communications	7	Regeneration	3
Chenchu administration	7	Fire protection	1½
Buildings	4	Miscellaneous	½

The charges on establishment are disproportionately high compared with the revenue derived; this is partly due to the necessity to maintain a large protective staff for the commercially unremunerative forests in the eastern portions of the division where the conservation of the forests is important in the interests of water-supply and agriculture. Most of the forests of Ganjivaripalli and Markapur Ranges are of the protective type and are unremunerative except for the grazing revenue derived from them. In the forecast provision has been made for a Madras Forest Service Officer as District Forest Officer to economise on establishment charges as the division cannot afford a high-paid official. The figures adopted against establishment in the forecast are the average figures which are usually adopted in working plans; these are lower than present actuals. The necessity to economise in travelling allowances and contingencies is emphasized. To a certain extent economies in this direction may be effected by shifting the headquarters of the District Forest Officer to Markapur which will be more central from the point of view of work.

646. *Results of working.*—The financial forecast reveals an average annual deficit of Rs. 6,100 as compared with the average deficit of Rs. 16,700 during the three years ending 1938. This is partly due to enhanced revenue from exploitation of timber and softwoods on a wider scale and largely due to reduction under establishment charges. In the financial forecast no credit has been taken for the hay operations envisaged in the Grazing Working Circle as it is in an experimental stage. Should the undertaking prove commercially remunerative the Forest department will stand to obtain a net revenue of Rs. 6,000 per annum under full working from this source. Stimulation of the trade in bamboo is likely to bring in greater revenue in the future. Development of the grazing grounds prescribed under the Grazing Working Circle is likely to attract larger numbers of foreign cattle and a greater revenue may be expected. Direction charges have not been included in the forecast. The proportionate amount debitable to this division under this head will be Rs. 6,000 per annum.

647. Estimated revenue and expenditure during the period of the plan ten years.

Revenue.	RS.	Expenditure.	RS.
		1. *Timber Working Circle.*	
1 By the sale of 11,950 c.ft. of standing timber annually from the Iskagundam, Obulesunipenta, Rakasipenta and Malakondapenta timber series at 10 annas per c.ft. for ten years ..	74,700	1 Demarcation of coupes, where necessary, marking and numbering trees for selection fellings over an area of 6,406 acres at 1 anna per acre ..	400
		* 2 Silvicultural marking and felling inferior species over an area of 2,764 acres in the Iskagundam and Obulesunipenta series only at 2 annas per acre	345
		3 Climber cutting and thinning over the whole area of 12,101 acres at 2 annas per acre	1,511
		4 Planting 50 acres with teak and *Pterocarpus marsupium* and subsequent tending at Rs. 40 per acre	2,000
Total ..	**74,700**	Total ..	**4,256 or 4,250**
		2. *Pole Working Circle.*	
By the sale of coupes in the following series. Average prices realized in the past have been adopted—		1 Demarcation and survey of 50 coupes at Rs. 15 per coupe.	750
Mogilutla 545 acres at Rs. 8 per acre ..	4,360	2 Raising 150 acres of plantation at Rs. 30 per acre.	4,500
Iskagundam 265 acres at Rs. 16 per acre.	4,240	3 Tending natural regeneration in the first, second and fifth years over an area of 2,616 acres at Re. 1–8–0 per acre.	3,924
Malakondapenta 590 acres at Rs. 8 per acre.	4,720		
Sandrapodu 769 acres at Rs. 20 per acre.	15,380		
Mamidigundam 447 acres at Rs. 12–8–0 per acre.	5,600		
Total ..	**34,300**	Total ..	**9,174 or 9,200**

* This prescription has been deleted.

3. *Small Timber Working Circle.*

Revenue.	RS.	Expenditure.	RS.
By the sale of marked trees in the coupes of seven series based on the average realization in the past—		1 Enumeration and marking in 70 coupes at Rs. 10 per coupe.	700
Peddachama series	1,600	*2 Rab regeneration over 25 patches in each coupe or 1,750 patches in all at 6 annas per patch.	650
Chintala series	1,500	3 Concentrated regeneration over 350 acres in combination with agriculture at Rs. 7 per acre.	2,450
Nallaguntla series	1,500		
Uyyalavada series	1,000		
Telugurayanicheruvu series	1,100		
Guttalachenu series	1,200		
Papinenipalli series	2,000		
Total ..	**9,900**	Total ..	**3,800**

NOTE.—Concentrated regeneration is to be done under departmental 'kumri'. It has been assumed that the cost of cultivation will be more than compensated by the return from the land.

4. *Softwood Working Circle.*

Revenue.	RS.	Expenditure.	RS.
By the sale of 6,100 c.ft. of softwood timber annually from the three series in Dornal, Gundlakamma and Turimella Ranges at 3 annas per cubic foot of standing timber for ten years.	11,440	1 Marking and numbering trees in 30 coupes at Rs. 15 per coupe.	450
		2 Raising 150 acres of softwood plantations at 12′ × 12′ at Rs. 15 per acre.	2,250
Total ...	**11,440**	Total ...	**2,700**

5. *Bamboo Working Circle.*

Revenue.	RS.	Expenditure.	RS.
By the sale of coupes every year in each of the following series during the next 10 years. The forecast is based on the average realization during the last 10 years—		Nil.	
Peddachama series	4,810		
Peddamantrala series	9,200		
Chinnamantrala series	13,820		
Chilakacherla series	1,730		
Iskagundam series	2,820		
Obulesunipenta series	2,820		
Malakondapenta series	5,240		
Tunnel series	8,560		
Bodi series	4,020		
Othumadugu series	4,540		
Guvvalapenta series	11,700		
Maduva series	2,000		
Chinnarutla series	1,000		
Nekkanti series	1,070		
Maddipenta series	9,050		
Turimella plains series	660		
Bommilingam series	500		
Total ..	**83,540**		

6. *Fuel Working Circle.*

Revenue.	RS.	Expenditure.	RS.
By the sale of the following ten coupes in each of the series. The rates are based on past realization—		1 Demarcation and survey of 130 coupes at Rs. 15 per coupe.	1,950
Donibavi series 541 acres at Rs. 3 per acre.	1,623	† 2 Rab regeneration over 9,069 acres of fuel area at As. 8 per acre. *	4,035
Diguvametta series 763 acres at Rs. 3 per acre.	2,289		
Kothakota series 806 acres at Rs. 2–8–0 per acre.	2,015		
Khajipuram series 417 acres at Rs. 2 per acre.	834		
Mallalamma series 1,496 acres at Rs. 3–8–0 per acre.	5,236		
Chintalapalle series 693 acres at Rs. 3–8–0 per acre.	2,425		
Veerareddikunta series 967 acres at Rs. 2–8–0 per acre.	2,417		
Yerraguntla series 987 acres at Rs. 2 per acre.	1,974		
Vemulakunta series 559 acres at Rs. 4–8–0 per acre.	2,515		
Thummalapenta series 648 acres at Rs. 7 per acre.	4,536		
Utla series 380 acres at Rs. 4 per acre.	1,520		
Gurralakonda series 297 acres at Rs. 3 per acre.	891		
Somidevipalli series 515 acres at Rs. 2 per acre.	1,030		
Total ..	**29,305** or **29,300**	Total ..	**5,985** or **5,990**

* Prescription deleted. † Rab regeneration deleted and concentrated plantation prescribed.

7. *Grazing Working Circle.*

Revenue.	RS.	Expenditure.	RS.
1 By sale of grazing permits for 10 years at the rate of Rs. 28,490 per annum. The average revenue from grazing during the three-year period ending 1938 has been Rs. 40,700. In the forecast 70 per cent of this revenue has been adopted as the rates were halved in 1938 but there has been a greater influx of cattle.	2,84,900	1 Improvement to watering facilities— Capital	5,225
		Recurring	750
		2 Cost of wire fencing two rotational grazing demonstration centres at Rs. 600 each.	1,200
		3 Manufacture of 120 tons of silage every year at Rs. 4 per ton.	4,800
		Cost of pits	80
2 By sale of manure at penta sites at Rs. 300 per annum.	3,000		
3 By sale of permits for fodder grass at Rs. 1,420 per annum.	14,200		
4 By sale of 120 tons of silage annually at Rs. 6 per ton.	7,200		
Total ..	**3,09,300**	Total ..	**12,055** or **12,060**

NOTE.—If hay operations are undertaken, the royalty on grass has not been taken into account in the forecast. In the first two years Rs. 100 every year may be expected and under full working Rs. 6,000 per annum.

8. *Minor Forest Produce Working Circle.*

Revenue.	RS.	Expenditure.	RS.
1 By the lease of several items of minor forest produce based on the average of the last three years at Rs. 6,270 per annum.	62,700	Cost of collecting 25 maunds of *Sterculia urens* gum every year at Rs. 6 per maund.	1,500
2 By sale of 25 maunds of *Sterculia urens* gum at Rs. 15 per maund for 10 years.	3,750		
Total ..	**66,150**	Total ..	**1,500**

9. *Manure Leaf Working Circle.*

Revenue.	RS.	Expenditure.	RS.
By the sale of manure leaf coupes at Rs. 200 per annum for 10 years.	2,000	Cost of regenerating 15 per cent of the coupes artificially 540 acres at Rs. 1–8–0 per acre.	810
Total ..	**2,000**	Total ..	**810**

10. *Miscellaneous.*

Revenue.	RS.	Expenditure.	RS.	RS.
1 By sale of 36 tons of charcoal every year at Rs. 30 per ton.	10,800	1 *Fire protection—*		
2 Miscellaneous fines, forfeitures, compounding fees, tree value on unreserves, etc., based on the average of the past three years at Rs. 13,642 per annum.	1,36,420	Fire tracing 87 miles of roads at Rs. 2–8–0 per mile.	217	
Total ..	**1,47,220**	Fire tracing 28 miles of bridle path at Rs. 2 per mile.	56	
		Fire tracing 31½ miles of footpath at Rs. 2 per mile.	63	
		Fire tracing 70 miles of fire lines at Rs. 5 per mile.	350	
		Fire tracing the plantations under timber, pole, small timber and softwood working circles at Rs. 1–8–0 per plantation.	99	
		Fire tracing the coupes in the pole series at Rs. 5 per coupe.	100	
		Fire tracing departmental buildings, etc.	65	
		Total ..	**950**	
		For ten years		9,500
		2 *Boundaries—* Maintenance and fire tracing 150 miles of boundaries at Rs. 3 per mile 450 for 10 years.		4,500
		3 *Roads—Maintenance—*		
		Mantralakanama road ..	1,000	
		Iskagundam	1,200	
		Obulesunipenta	300	
		Sandrapodu	600	
		Forty-six miles of other roads at Rs. 20 per mile.	920	
		Sixty-five miles of bridle paths at Rs. 10 per mile.	650	
		Total ..	**4,670**	
		For ten years		46,700
		New roads—		
		Road beyond Sandrapodu.	3,000	
		Guttalachenu road ..	3,000	
		Diguvametta-Malakondapenta road metalling 4 miles.	8,000	
		Total ..		**60,700**
		4 *Buildings—*		
		Maintenance at Rs. 3,000 per annum.	30,000	

Revenue.	Expenditure.	RS.	RS.
	10. *Miscellaneous*—cont.		
	4 *Buildings*—cont.		
	Rollapenta rest-house repairs.	1,000	
	New inspection shed at Sandrapodu.	1,500	
	Total ..		**32,500**
	5 *Water-supply*—		
	Improvements and maintenance.		2,800
	6 *Chenchu administration*—		
	Based on past averages at Rs. 6,149 per annum.		61,490
	7 *Charcoal manufacture*—		
	Cost of making and transporting 36 tons of charcoal per annum at Rs. 20 per ton.		7,200
	8 *Tree planting*—		
	Maintenance of nurseries at Rs. 100 per annum.		1,000
..	**Grand Total** ..		**1,79,690**
	Establishment—		
	1 Pay of a District Forest Officer of the Madras Forest Service at Rs. 422 per mensem.	5,064	
	2 Six Rangers at Rs. 96 per mensem.	6,912	
	3 Sixteen foresters at Rs. 34 per mensem.	6,528	
	4 Fifty-four forest guards at Rs. 17 per mensem.	11,016	
	5 Fifty-three reserve watchers at Rs. 10 per mensem.	6,660	
	6 Head Clerk at Rs. 66 ..	792	
	Accountant at Rs. 66 ..	792	
	Typist at Rs. 42 ..	504	
	Draughtsman at Rs. 42 ..	504	
	Clerks 11 at Rs. 42	5,544	
	Peons 10 at Rs. 15	1,800	
	Office and bungalow watchers 12 at Rs. 9-8-0.	1,368	
	Punka-puller 1 for 4 months at Rs. 9-8-0.	38	
	Total ..	**47,522**	
	For ten years		4,75,220
	7 Travelling and other allowances based on the average of the past three years at Rs. 9,794 per annum.		97,940
..	8 Contingencies based on the average of the past three years at Rs. 3,600 per annum.		36,000

648. Abstract of revenue and expenditure—

	Revenue. RS.	Expenditure. RS.
1 Timber Working Circle	74,700	4,250
2 Pole Working Circle	34,300	9,200
3 Small Timber Working Circle	9,900	3,800
4 Softwood Working Circle	11,440	2,700
5 Bamboo Working Circle	83,540	..
6 Fuel Working Circle	29,300	5,990
7 Grazing Working Circle	3,09,300	12,060
8 Minor Forest Produce Working Circle ..	66,150	1,500
9 Manure Leaf Working Circle	2,000	810
10 Miscellaneous	1,47,220	1,79,690
11 Establishment—Pay	..	4,75,220
Allowances	..	97,940
Contingencies	..	36,000
Total ..	**7,67,850** or **7,68,000**	**8,29,160** or **8,29,000**

	RS.
Anticipated average annual revenue is ..	76,800
Estimated average annual expenditure is ..	82,900
Average annual deficit.	**6,100**

649. Comparative Statement.

Revenue.

Particulars.	Actuals for three years. 1935–36.	1936–37.	1937–38.	Average for three years.	Working Plan forecast.	Remarks.
	RS.	RS.	RS.	RS.	RS.	
1 Timber	12,135	11,567	13,711	12,471	13,034	More timber and softwood extraction.
2 Fuel	1,177	2,248	2,771	2,065	2,930	Enhanced revenue due to more fuel series.
3 Bamboo	13,187	10,548	6,209	9,980	8,384	During the three years more revenue was derived as all coupes in a series were leased together due to bamboo flowering. For some years to come bamboo revenue may be less. Average of the past 10 years has been adopted.
4 Grazing	41,096	41,656	39,341	40,704	30,930	Grazing fees were reduced in 1938. Only 70 per cent of the average revenue of the three-year period has been taken in the forecast.
5 Minor forest produce.	5,106	6,163	7,543	6,270	6,815	....
6 Miscellaneous ..	13,287	14,445	13,195	13,642	14,722	The increase is due to revenue from charcoal.
			Total ..	85,132	76,815 or 76,800	The fall is mostly due to fall in grazing revenue due to reduction of grazing fees.

Expenditure.

Particulars.	Actual for three years. 1935–36.	1936–37.	1937–38.	Average for three years.	Working Plan forecast.	Remarks.
	RS.	RS.	RS.	RS.	RS.	
1 Exploitation ..	8,019	7,970	7,773	7,920	2,501	Pay of reserve watchers is debited to exploitation in the district accounts whereas it has been included under establishment in the forecast.
2 Regeneration ..	630	459	634	574	2,350	Intensive regeneration work is prescribed.
3 Fire protection ..	698	594	576	622	950	....
4 Buildings ..	3,463	3,678	5,261	4,134	3,530	In 1937–38 the amount includes a capital construction.
5 Communications.	5,792	6,070	5,217	5,693	6,070	Forecast includes new constructions.
6 Miscellaneous ..	401	523	446	456	450	....
7 Establishment ..	76,103	72,986	79,700	76,263	60,916	The reduction in the forecast is due to (a) Provision of a Madras Service Officer as District Forest Officer. (b) adopting figures given for working plan purposes by the Conservator which are lower than actuals. (c) Reduction in Foresters.
8 Chenchu administration.	6,032	6,367	6,048	6,149	6,149	....
			Total ..	1,01,811	82,916 or 82,900	The reduction is mostly under establishment charges.

SECTION 2.—COST OF THE PLAN.

650. *Cost.*—The following statement shows the cost of the working plan from the date when work in old Kurnool East was commenced until work in the new Kurnool East Division was completed. A working plan for the old Kurnool East was prepared and was sanctioned in 1939 for a period of one year by the Chief Conservator of Forests. Consequent on the abolition of old Kurnool South, which caused considerable changes in old Kurnool East, the Yerragondapalem Range of old Kurnool East for which a complete working plan was made was transferred to Guntur Division and all relevant parts of the working plan and complete sets of maps were sent to the Working Plan Officer, Guntur, for incorporation. Similarly, the three reserves falling in Nellore district were transferred to the Nellore Division and the relevant parts of the working plan and necessary maps were sent to the District Forest Officer, Nellore. The total area of new Kurnool East is 1,072 square miles and that of Yerragondapalem Range is 239½ square miles and that of the three reserves transferred to Nellore is 41½ square miles. The cost of the working plan given below therefore represents the cost of preparing a working plan for 1,358 square miles and also cost of compilation of statistics and writing up two working plans, one for old Kurnool East and the other for new Kurnool East :—

	RS.
10. C. Capital outlay—	
Pay of officers—Voted	15,677
Pay of establishment—	
1 Permanent	13,916
2 Temporary	1,028
Other charges—	
1 Travelling allowances—Voted	9,050
2 Fixed travelling allowance	1,632
3 Other conveyance allowances	181
4 Contingencies	2,268
5 Working Plan (field work)	995
Total ..	44,747

Cost of the plan per square mile of reserved forest is Rs. 33 or Re. 0–0–9·5 per acre.

M. H. KRISHNASWAMY,
Working Plan Officer, No. IV Division, Kurnool.

19*th February* 1940.

SUMMARY OF PRESCRIPTIONS.

CHAPTER I—BASIS OF PROPOSALS.

Sub-title.	Prescriptions.	Paragraph
1 Objects of management.	The objects of management are— (*a*) To exploit the forests on silvicultural lines to produce revenue to the State ..	..
	(*b*) To supply the local demands of the people for fuel, timber, small timber, bamboo, grazing, etc.	..
	(*c*) To protect the forests and conserve them for their indirect benefits	..
	(*d*) To concert measures for the amelioration of the condition of the Chenchus	266
2 Working circles ..	Nine working circles are formed as shown below :— ACS. (*a*) The Timber Working Circle .. .. .. 25,450 (*b*) The Pole Working Circle. 13,936 (*c*) The Small Timber Working Circle .. .. 44,086 (*d*) The Softwood Working Circle .. .. 54,973 (*e*) The Bamboo Working Circle .. .. .. 284,301 (*f*) The Fuel Working Circle. 27,511 (*g*) The Grazing Working Circle .. .. Entire division.	

Sub-title.	Prescriptions.	Paragraph
2 Working circles—*cont.*	(*h*) The Minor Forest Produce Working Circle. — ACS. Entire division	
	(*i*) The Manure Leaf Working Circle 3,605	269
3 Period of the plan ..	The working plan will be in force for a period of ten years from the 1st of April 1940 ..	271

CHAPTER II—TIMBER WORKING CIRCLE.

Sub-title.	Prescriptions.	Paragraph
1 Constitution	All areas on the Iskagundam plateau containing appreciable quantities of exploitable trees of valuable species either occurring pure or in mixture with bamboo are included.	273
2 Area	The area of the working circle is 25,450 acres ..	274
3 Felling Series	Four felling series are formed	274
4 System	Exploitation will be on a selection basis ..	277
5 Exploitable species and size.	Teak and *Lagerstroemia parviflora.* — 4 feet and above in girth over bark at breast height.	
	Pterocarpus marsupium, Terminalia Tomentosa, Dalbergia latifolia, Albizzia lebbeck. — 4½ feet and above in girth over bark at breast height.	
	Adina cordifolia, Stephegyne parvifolia, Bassia latifolia. — 5 feet and above in girth over bark at breast height.	
	Anogeissus latifolia .. — 3 feet and above in girth over bark at breast height.	
	All dead trees, provided they are marketable at a profit will be exploited	278
6 Felling cycle	A felling cycle of 20 years is prescribed ..	279
7 Division into coupes ..	Ten coupes prescribed for felling during the period of the plan are shown on the detailed maps	280
8 Yield	The yield will be regulated by area. On a rough estimation the annual yield will be 11,950 c.ft. of timber	281
9 Statement of fellings ..	A statement showing the sequence in which the coupes are to be exploited is given ..	282
10 Coupe	Annually one coupe in the serial order given will be taken up for exploitation	283
11 Marking	All trees of the exploitable species and the sizes mentioned above will be marked for felling provided that of two exploitable trees within 100 feet of each other only one may be marked	285
12 Tending	A climber cutting and thinning congested patches of valuable poles and saplings will be done at the time of marking	287–288
13 Agency of felling ..	Normally exploitation will be made by contractors. Departmental exploitation may be done	289–290
14 Regeneration . ..	No artificial regeneration will be done in the Rakasipenta and Malakondapenta series. An area of fifty acres suitable for planting has been selected in the Iskagundam series. Annually five acres will be planted up with one year old teak and yegi (*Pterocarpus marsupium*) stumps at an espacement of 6′ × 6′ to compensate the removal of trees under the selection fellings. Details of planting work are given	293–303
15 Tending	Casualties will be replaced in the first year only. Weeding and soil working will be done in the first year, and will be repeated in the second year in respect of backward plants. A cleaning and creeper cutting will be done in the fifth year. Thinnings will be done when they become necessary.	305–308

Sub-title.	Prescriptions.	Paragraph
16 Fire protection.. ..	The regeneration areas will be fire protected by clearing and burning a line 30′ wide all round in the month of January for a period of 10 years	309
17 Grazing	The plantations will be closed to grazing during the period of the plan	310
18 Control	A Control Book, a Record of Works, a Regeneration Ledger, a Control Map and a Nursery Ledger will be maintained	312

CHAPTER III—POLE WORKING CIRCLE.

Sub-title.	Prescriptions.	Paragraph
1 Constitution	The working circle embraces all reasonably good pole forests situated within economic distance to make exploitation remunerative	313
2 Area	The area is 13,936 acres	316
3 Felling series	Five felling series are constituted	317
4 System	The system will be coppice with retention of advance growth of valuable species up to 12 inches in girth at breast height	321
5 Rotation	Fifty years	322
6 Coupes	Ten coupes intended for felling during the period of the plan are shown on the detailed maps	323
7 Yield	The annual yield will be regulated by area but a rough forecast of outturn is 27,500 c.ft. of timber	324
8 Statement of fellings ..	The sequence in which the coupes are to be worked is given in a statement	325
9 Demarcation	The annual coupe will be demarcated on the ground by a cut line 6′ wide all round it in the month of January preceding the year of felling. The coupe will be divided into a suitable number of strips	327
10 Agency of exploitation.	Felling and extraction on contract will be the normal procedure	328
11 Period of lease ..	The period of lease will be one year from the 1st of April, fellings must be completed by the end of December; time for removal of the produce may be granted to the end of March ..	329
12 Felling rules	The annual coupe will be felled of all woody growth except the advance growth which has been retained; all tamarind trees and bamboo will be left unfelled. Felling will progress strip by strip. The contractor will be bound to clearfell all woody growth including bamboos in the area chosen for planting and heap the felled material as directed ..	331
13 Artificial regeneration.	In each series within the area proposed for felling during the period of the plan, areas suitable for planting have been chosen and are indicated on the detailed maps. In each series exploited annually, about 1/15th of the area of the coupe will be planted up as a measure of regeneration. The statement shows the area to be planted up in each series :— Mogilutla series .. .. 3 acres. Iskagundam .. .. 2 ,, Malakondapenta .. .. 3 ,, Sandrapodu .. .. 4 ,, Mamidigundam .. .. 3 ,, Instead of planting small areas in each series, planting may be concentrated in each range. The regeneration area will be demarcated at the time of survey of the coupe. Timber above 24 inches in girth will be allowed to be removed by the contractor; all other material will be felled and piled by him in stacks 30′ × 30′ × 3′ which will be evenly distributed over the area. The stacks will be burnt and the the area will be planted up over one half of it with one year old teak stumps and over the other half with one or two year old *Pterocarpus marsupium* stumps in crowbar holes at an espacement of 6′ × 6′. Details of planting and tending are given	333

Sub-title.	Prescriptions.	Paragraph
14 Nursery	Details are given	334
15 Natural regeneration ..	Existing natural regeneration of valuable species will be tended in the first, second and the fifth years	335
16 Cost	The cost of regeneration operations and tending measures will be Rs. 3–8–0 per acre of the annual coupe	336
17 Grazing	Felled coupes will be closed to grazing for a period of four years from the year of felling and the plantations for a period of 10 years from the year of formation	337
18 Fire protection ..	Felled coupes will be fire protected for a period of 4 years from the year of felling by burning a line 30 feet wide all round.. Plantations will be fire protected for a period of 10 years from the year of formation by scraping a line 6 feet wide all round in the month of January every year	338
19 Coupe stones	Stones showing the felling series, coupe number and year of felling will be planted at salient corners. Stones showing the year of plantation will be planted at the corners of the plantations.	339
20 Control	A Control Book, a Record of Works, a Regeneration Ledger, a Nursery Ledger, and Control Maps will be maintained	340

CHAPTER IV—SMALL TIMBER WORKING CIRCLE.

Sub-title.	Prescriptions.	Paragraph
1 Constitution	All reasonably accessible areas containing appreciable growth of species utilizable as small timber are included	342
2 Area	The area of the working circle is 44,086 ..	343
3 Felling series	Seven felling series are formed	344
4 System	Exploitation will be on a selection basis with a girth limit of 42 inches over bark at breast height for *Hardwickia binata* and 18″ in the case of *Chloroxylon swietenia*, *Albizzia amara*, *Anogeissus latifolia* and *Acacia leucophloea* ..	349–351
5 Felling cycle	Ten years	352
6 Coupes	Annually one coupe in each series in the serial order given in the statement of fellings will be taken up for exploitation	355
7 Marking	Marking of the exploitable trees will be done with the co-operation of the villagers ..	356
8 Agency of fellings ..	Fellings may be leased on contract or done departmentally	357
9 Regeneration	In each of the felling series a block of 50 acres of land suitable for cultivation has been selected for regeneration. Annually in each block five acres will be regenerated with specified species under departmental 'kumri'. Details of the work are given	358–370
10 Protection	The kumried areas will be closed to grazing for a period of 10 years from the year of formation and will be fire protected by scraping a line 6′ wide all round	372
11 Control	A Control Book, a Record of Works, a Regeneration Ledger and Control Maps will be maintained	373

CHAPTER V—SOFTWOOD WORKING CIRCLE.

Sub-title.	Prescriptions.	Paragraph
1 General	The slate industry at Markapur consumes annually about 60,000 c.ft. of soft wood timber for conversion into slate frames and packing cases. The local supply is only about 8,000 c.ft. The species utilized are *Givotia rottleriformis*, *Bombax malabaricum*, *Gyrocarpus jacquini*. The value of the industry is Rs. 1,50,000. The price of slates has come down from Rs. 22–8–0 per case of 4 dozen slates in 1922 to its present level of Rs. 2–8–0 per case, while the number of cases exported has increased from 10,000 in 1922 to 36,000 in 1938 ..	374, 375

Sub-title.	Prescriptions.	Paragraph
2 Constitution	Areas containing appreciable growth of soft-wood species and accessibly situated are included.	376
3 Area	The area of the working circle is 54,973 acres ..	377
4 Felling Series	Three felling series are constituted one in each of the Ranges of Dornal, Gundlakamma and Turimella	379
5 Analysis	Enumerations made over 496 acres reveal the fact that one exploitable tree may be found in every 2 acres of forests included ..	380
6 System	Selection system	381
7 Exploitable species and size.	*Givotia rottleriformis*, *Bombax malabaricum*, *Gyrocarpus jacquini*. 42 inches and above in girth over bark at breast height.	382, 383
8 Felling cycle	Ten years.	384
9 Coupes	Each series is divided into ten coupes. One coupe will be taken up in each series in the serial order given every year for exploitation.	385
10 Yield	The yield will be regulated on an area basis and a rough forecast of outturn will be 6,100 c.ft. per annum	386
11 Exploitation	Marked trees may either be sold standing to a contractor or extracted departmentally ..	387
12 Regeneration	In each series a block of 50 acres has been selected for planting. Annually 5 acres in each block will be planted up or sown at an espacement of 12′ × 12′	..
	Stumps of *Givotia rottleriformis* will be planted in crowbar holes over one half of the area in June and seeds of *Ailanthus excelsa* and *Bombax malabaricum* will be sown towards the end of May over ½ of the area each ..	..
	Tending measures are prescribed	..
	Regeneration operations in the Turimella series will not be taken up till road communications are bettered	391–395
13 Kumri	The Chenchus of Peddamantrala may be allowed to kumri the regeneration area in Dornal Range if they are willing to do it	396
14 Grazing	Regenerated areas will be closed to grazing during the period of the plan	398
15 Fire protection ..	Regenerated areas will be fire traced by scraping a line 6′ wide all round for a period of ten years from the year of formation	399
16 Control	A Control Book, a Regeneration Ledger and a Control map will be maintained	400

CHAPTER VI—BAMBOO WORKING CIRCLE.

Sub-title.	Prescriptions.	Paragraph
1 Constitution	All areas containing bamboos in commercially exploitable quantities are included in this working circle. A total area of 2,296 acres of effective bamboo area has been excluded as the areas are either inaccessibly situated or the bamboo occurs so scattered that it is not worthwhile including them in any series.	401
2 Area	The area of the working circle is 284,301 acres. The effective bamboo area is 52,813 acres ..	403
3 Felling series	The working circle is divided into 17 felling series. The boundaries of the felling series and coupes follow natural features. The inclusion of large areas of non-bamboo was inevitable	..
	A description of the boundaries of the series is given	404
4 System	The system will be selection thinning of bamboo clumps on an area basis	413
5 Felling cycle	Three years	414
6 Coupes	Each series is divided into three coupes ..	415
7 Agency of fellings ..	Normally, fellings will be made through the agency of contractors. Chenchu labour should invariably be employed in localities where they are available	..

Sub-title.	Prescriptions.	Paragraph
7 Agency of fellings—*cont.*	Permits may be issued for bamboos in the Bommilingam, Papinenipalli and Maduva bamboo series if contractors are not forthcoming to buy the coupes	..
	The Chinnarutla series will be worked departmentally	419
8 Period of lease ..	The period of lease will be one year from the 1st of April	420
9 Exploitation	Annually one coupe in each series will be exploited in the order given in the statement of fellings	422
10 Felling rules	The following felling rules are prescribed—	
	(*a*) No new culms may be felled	..
	(*b*) A minimum of six mature culms will be left behind in each clump exploited ..	..
	(*c*) Fellings will be made on the side opposite to that where the largest number of new culms are found	..
	(*d*) Cutting should be low but never below one foot from ground level	..
	(*e*) Removal of culms with the rhizomes is prohibited	..
	(*f*) In flowered bamboo areas culms should be cut only after the seeding is over ..	..
	(*g*) Tending of the clumps will be done at the time of exploitation	..
	Felling rules should be strictly observed in all departmentally worked coupes	423
11 Statement of fellings ..	A tabular statement showing the order in which the coupes are to be felled is given.	
	A description of the boundaries of each coupe is given	424
12 Grazing	No restriction will be made	425
13 Fire protection	The fire protection of the bamboo areas will be included in the general fire protection scheme.	426
14 Control	A Control Book and a Record of Works will be maintained	428
	CHAPTER VII.—FUEL WORKING CIRCLE.	
1 Object	The object is to supply firewood to the townships of Cumbum and Giddalur and also to villages bordering on reserved forests ..	430
2 Constitution	All well-stocked fuel areas which are accessibly situated are included in the working circle....	432
3 Area	The area of the working circle is 27,511 acres ..	433
4 Felling series	The working circle is divided into thirteen felling series	434
5 System	Simple coppice with retention of tamarind and *Feronia elephantum* trees	435
6 Rotation	Thirty years	436
7 Coupes	Ten coupes intended for felling during the period of the plan are shown on the detailed maps	437
8 Yield	The yield will be regulated by area. The annual output of fuel will be 2,000 tons	438
9 Exploitation	Annually one coupe in each series in the serial order given will be sold	439
10 Demarcation	The annual coupe will be demarcated on the ground by a cut line 6 feet wide all round it in the month of December	440
11 Sale	The sale will be held in February	441
12 Felling rules	The following felling rules are prescribed—	
	(1) All woody growth may be felled with the exception of tamarind and *Feronia elephantum* trees	..
	(2) Fellings should progress strip by strip ..	..
	(3) All wood above 5 inches in girth should be stacked before removal	..
	(4) Manufacture of charcoal may be permitted on approved sites	442
13 Statement of fellings ..	A tabular statement of fellings is given ..	443
14 Regeneration	Concentrated regeneration is prescribed. Details are given	444–450

Sub-title.	Prescriptions.	Paragraph
15 Demarcation	There will be no necessity for the permanent demarcation of felled coupes	451
16 Grazing	Felled coupes will be closed to grazing for a period of four years from the year of felling ..	452
17 Control	A Control Book, a Record of Works, a Regeneration Ledger and a Control Map will be maintained	454

CHAPTER VIII—GRAZING WORKING CIRCLE.

Sub-title.	Prescriptions.	Paragraph
1 Constitution	With the exception of small scattered areas which may be closed for silvicultural considerations the rest of the division will be open to grazing	455
2 Regulation of grazing.	Grazing will be regulated by the issue of permits at rates specified below :—	

	Sheep. RS. A. P.	Cow and bull. RS. A. P.	Buffaloes. RS. A. P.
1 Non-penta and local cattle ..	0 2 0	0 4 0	0 6 0
2 Penta cattle for penning in one range ..	0 4 0	0 8 0	1 0 0
3 Penta cattle for penning over the whole division	0 5 0	0 10 0	1 5 0

Sub-title.	Prescriptions.	Paragraph
	(Rates above)	457
	'Local cattle' are defined as cattle belonging to *bona fide* agriculturists living in villages which are situated within 5 miles of a reserved forest boundary under departmental control.	458
	A list of hamlets entitled to 'local cattle' concessions is given	458
3 Unit of grazing ..	The entire forest division will form a unit of grazing	461
4 Penning	'Local cattle' will be allowed the privilege of being penned in the approved pentas of the range to which the village is allotted without any further charge ..	462
	'District cattle' at non-penta rates will be allowed to be penned in the approved pentas of one range by paying the difference in rates	459
	'Penta cattle' will be permitted to be penned in the approved pentas of the range or the whole division according to the nature of the permit	463
	No other permit can be exchanged for a permit of a higher denomination by paying the difference in rates	464
	Material for the construction of huts and fence round the pentas will be allowed to be removed free from the forest nearby	465
	Penta construction and penta hygiene should be on approved lines ; refund of half the grazing fee on sugali's own cattle will be allowed if penta hygiene and construction are satisfactory to the department	466
	A list of approved pentas in the division is given. No changes may be effected without the previous approval of the Conservator	467
	Manure in penta sites will be allowed to be removed on payment of a seigniorage of four annas per cart-load	469
5 Fodder-grass ..	The removal of grass fodder in headloads from reserves for *bona fide* domestic use will be allowed free of charge ; a fee of 5 annas per cart-load will be levied on removals in cart-loads. Conditions regarding collection and removal of fodder-grass are given ..	471

Sub-title.	Prescriptions.	Paragraph
6 Closure of burnt areas.	Immediate closure of areas burnt wilfully for short periods is recommended	472
7 Watering facilities ..	A detailed programme of improvements to existing watering facilities where necessary and the creation of new ones where none exist is given. The importance of this matter is emphasized	473
8 Rotational grazing ..	The advantages of rotational grazing are discussed in general	474–477
	A large scale experiment in rotational grazing will be conducted in the Veligondas in the old 'Mallalamma Agricultural Implement Series' near Janapalacheruvu. The area of the rotation block is 1,200 acres divided into three paddocks; capacity 400 cow units; rotation about one month	478–481
	The period of the experiment is three years ..	482
	Two small scale demonstration centres are prescribed. The area of each centre is 40 acres, divided into four paddocks. Capacity 10 cow units. Grazing will be admitted, continuously in the central paddock and 10 cow units in rotation over the other three paddocks. Details are given	486–492
9 Rotational burning ..	The rotational burning of grass lands on the Guttalachenu and Nekkanti plateaux on a cycle of 2 years with the assistance of the graziers under departmental supervision is prescribed	493–499
10 Grass and fodder centres.	The raising of grass and fodder centres in localities where demand for land for expansion of cultivation exists is prescribed as a measure of reclaiming fast deteriorating grazing grounds and improving them. Grass and fodder crops will be raised on the area in combination with agriculture. Provision is made for continuity of cultivation. Five acres will be granted to each cultivator. Fodder species will be sown in lines in the first year. When the cultivation is stopped fodder grasses will be introduced. Full details are given	500–509
11 Improvement of stock.	The need to keep stud bulls of good local breed at important pentas and for increased veterinary assistance to the penta cattle are emphasized	510–511
12 Silage	The manufacture of silage in eight localities for the purposes of demonstration to the villagers is prescribed and full details are given. Silage can both be kept as a fodder reserve for use in seasons of scarcity and its manufacture may be undertaken as a famine relief measure.	512–525
13 Hay making	The possibilities of manufacturing hay from areas close to the railway line for supply to local centres as well as for export to the neighbouring districts are discussed and the making of 50 tons of hay annually to start with is prescribed. Details are given ..	526–530

CHAPTER IX—MINOR FOREST PRODUCE WORKING CIRCLE.

Sub-title.	Prescriptions.	Paragraph
1 Constitution	The working circle embraces all the reserved forests under departmental control and the unreserves in the division	534
2 Treatment	*Cassia auriculata* (tangedu) bark will be leased once in two years each range forming a unit of lease. The period of lease will be two years	537
	Cassia fistula (rela) bark will be leased on a five-year cycle. The period of lease will be one year from the 1st of April	538

Sub-title.	Prescriptions.	Paragraph
2 Treatment—*cont.* ..	Honey and wax will be collected departmentally.	540
	All other kinds of produce except gum. Each range will form a unit of lease. The sale will be held in September. The period of lease will be one year from the 1st of October. The right to buy from the Chenchus, in places where they exist, at scheduled rates and the right to collect directly in places where Chenchus do not exist will be sold to a contractor who will organize the collection and sale ..	542
3 *Sterculia urens* gum ..	The tapping of *Sterculia* trees for their gum in three localities in Dornal, Gundlakamma and Turimella Ranges is prescribed. The number of trees in each locality is—	

Range.	Locality.	Number of trees.
Dornal ..	Chinnamantrala ..	1,478
Gundlakamma.	Malakondapenta ..	1,140
Turimella ..	Maddipenta ..	1,534

		547
	A tapping cycle of four years is adopted ..	548
	Details regarding blazing and gum collection are given	550–551
..	The yield will be 25 maunds per annum ..	552
4 Regeneration	The planting of trees of tamarind, *Sapindus emarginatus* and *Terminalia chebula* along margins of specified forest roads by the beat staff is prescribed as a measure of regeneration	556–558
5 Control	A Control Book and a Record of Works will be maintained	560

CHAPTER X—MANURE LEAF WORKING CIRCLE.

Sub-title.	Prescriptions.	Paragraph
1 General policy	The general policy of Government is discussed and a case has been made out for the abolition of the existing 'permit system' and replacing it by a system of leasing annual coupes ..	561–568
2 Constitution	All areas in reserves in close proximity to Cumbum or Markapur and containing species useful as manure leaf are included	570
3 Area	The area of the working circle is 3,605 acres ..	571
4 Felling series	Two felling series are formed	573
5 System	Pollarding or coppicing as the case may be will be the system	574
6 Choice of species ..	Any species may be collected	575
7 Felling cycle	Two years	576
8 Working	Each series is divided into two coupes ; annually one coupe will be exploited. The cut should be clean and low in the case of coppice and high in the case of pollard	577
9 Regeneration	Concentrated artificial regeneration over 15 per cent of the annual coupes during the period of the plan is prescribed. Details are given.	579–581
10 Grazing	Intensively regenerated areas will be closed to grazing till the regeneration is fit for exploitation. Other parts of the coupe will not be closed to grazing	583
11 Control	A Control Book, a Record of Works and a Regeneration Ledger will be maintained ..	585

CHAPTER XI—MISCELLANEOUS REGULATIONS.

Sub-title.	Prescriptions.	Paragraph
1 Fire protection ..	Early burning will be discontinued. Inter-district, inter-divisional and range boundaries will be fire traced annually in January as a measure of boundary maintenance. The total length is 150 miles	590

Sub-title.	Prescriptions.	Paragraph
1 Fire protection—*cont.*	Important roads, bridle-paths and foot-paths passing through valuable timber and bamboo forests will be cleared annually and fire traced— Roads Length 86 miles 7 furlongs. Bridle-paths ,, 28 ,, 3 ,, Foot-paths ,, 31 ,, 4 ,,	591
	Important existing fire lines will be fire-traced in January to protect valuable timber forests. Length 69 miles 7 furlongs	592
	Departmental buildings will be fire-traced annually	594
2 Roads	*Mantralamma road.*—Annually a sum of Rs. 1,000 will be spent on maintenance and improvement	597
	Iskagundam road.—Annually a sum of Rs. 1,200 will be expended on maintenance and improvement. The first four miles from Diguvametta will be metalled progressively from 1940 at the rate of one mile every year	598
	Obulesunipenta road.—A sum of Rs. 300 will be spent every year on maintenance and improvement	599
	Sandrapodu road.—A sum of Rs. 600 will be spent every year on maintenance and improvement. The road from Sandrapodu will be extended southwards over a distance of 8 miles. Cost Rs. 4,000	600
	Guttalachenu road.—The gorge section will be improved and the road put right from Regumanipenta to Guttalachenu at an estimated cost of Rs. 3,000	601
	General maintenance.—All other forest roads will be maintained to the extent funds permit. On an average a sum of Rs. 20 per mile per annum will be provided	602
	The desirability of connecting forest roads ending on reserve boundaries with the main roads is discussed.	603
	Bridle-paths.—Existing bridle-paths will be maintained at a cost of Rs. 10 per mile per annum	604
3 Buildings	Existing buildings will be maintained in a state of good repair	605
	The rest-house at Rollapenta will be repaired at a cost of Rs. 1,000	606
	A new inspection shed at Sandrapodu will be constructed at a cost of Rs. 1,500	606
4 Wells	Existing departmental wells will be maintained.	607
	A programme of improvements to existing water supplies to departmental buildings and the erection of new ones where none exist is given	608–609
5 Chenchus	*Schools* will be continued and bettered with a re-orientation of policy	610
	Cultivation.—Expansion of cultivation by Chenchus is recommended	611
	Cattle.—Any excess over the number admitted at settlement due to expansion of cultivation need not be discouraged	612
	Goats.—The number admitted at settlement for the district as a whole should not be exceeded. Census to be taken and allocations to be made. Details are given. Allocations are to be revised annually	613
	Post of Assistant Chenchu Officer.—The post will be abolished permanently	615
6 Land for cultivation ..	No disafforestation is to be made. The raising of grass and fodder centres in combination with agriculture as a measure of meeting the demand is suggested. Details are given ..	617–620

Sub-title.	Prescriptions.	Paragraph
7 Charcoal manufacture.	An area of about 3,000 acres in the Telugurayanicheruvu valley may lend itself to charcoal making on a remunerative scale. To study market conditions and to initiate the staff and labour in the manufacture of charcoal, annually 30 acres will be clear-felled and converted into charcoal. Ten coupes are shown. Details of manufacture are given. The produce will be marketed in Guntur. Regeneration will be done in felled areas ..	621–627
8 Tree planting	Increased interest is being evinced in this activity and central nurseries are prescribed.	628
9 Teak plantations ..	The felling of the plantations when this plan is due for revision is suggested. During the period of this plan measurements are to be recorded to note the rate of increment ..	629
10 Thorn and fuel.. ..	On an application being received, the District Forest Officer will have discretion to sell in any locality bordering on village land and not included in any of the felling series, an area of not less than 5 acres for collection of thorn and fuel on a short voidah at a nominal rate ..	630
11 Boundaries	Details of boundary maintenance are given ..	631
12 Rain gauge	A list of rain gauges maintained by the department is given and measurements will be recorded in accordance with existing practice.	632
13 Sandal	Existing sandal will be tended as and when necessary	633
14 Petty fellings	Petty fellings inside reserves for departmental use or for free grants, etc., will not constitute a deviation from the working plan	634
15 Palmyra working ..	Palmyra trees exist in appreciable numbers in the Mundlapad reserved forest. Should a demand arise the District Forest Officer may sell marked trees in public auction	635
16 Red sanders	Red sanders occurs in fair profusion bordering on Cuddapah district but the material is not big enough for exploitation now	636
17 Experimental plots ..	Sample plots 25 and 27 near Iskagundam and a *Diospyros melanoxylon* tree near Maddipenta will be preserved	637
18 Control	Existing forms would suffice. No new forms are prescribed. The control records to be maintained for each working circle are prescribed under the respective chapters. A register of deviations is to be maintained. A Control Journal should be maintained, separate pages being allotted to each working circle. The necessity for the proper maintenance of control records is emphasized ..	638–640

CHAPTER XII—ESTABLISHMENT AND LABOUR.

1 Establishment	A reduction in the number of foresters by four is prescribed	641
2 Labour	Ample labour is available except in Giddalur and Gundlakamma ranges for which proposals are given	642

CHAPTER XIII—FINANCIAL FORECAST.

1 Revenue	The anticipated annual revenue is Rs. 76,800.	644
2 Expenditure	The anticipated annual expenditure is Rs. 82,900.	645
3 Results of working ..	The financial results show a deficit of Rs. 6,100 per annum which may be wiped out if hay operations are remunerative and if trade in bamboo is stimulated	646
4 Statements	The following statements are given—	
	Revenue and expenditure for ten-year period.	647
	Abstract of revenue and expenditure ..	648
	Comparative statement showing past average and forecast	649
5 Cost of the plan ..	The cost of the working plan is Rs. 44,747 which works out to Rs. 33 per square mile. The amount includes the cost of preparing two working plans, one for old Kurnool East and the other for new Kurnool East	650

APPENDIX I.

List of Species.

Serial number.	Botanical name.	Telugu name.
1	*Abrus precatorius*	Guriginja.
2	*Acacia arabica*	Nallatumma.
3	*Acacia caesia (Acacia intsia)*	Korinda.
4	*Acacia latronum*	Burrajala.
5	*Acacia leucophlœa*	Tellatumma.
6	*Acacia pennata*	Gubakorinda
7	*Acacia sundra*	Sundra.
8	*Adhatoda vasica*	Addasaram.
9	*Adina cordifolia*	Rudraganapa.
10	*Aegle marmelos*	Maredu.
11	*Ailanthus excelsa*	Peddamanu.
12	*Alangium salvifolium*	Udaga.
13	*Albizzia amara*	Chikreni.
14	*Albizzia lebbek*	Dirisinam.
15	*Albizzia odoratissima*	Chinduga.
16	*Anogeissus latifolia*	Chirumanu.
17	*Atalantia monophylla*	Adavinimma.
18	*Azadirachta indica*	Vepa.
19	*Balanites roxburghii*	Gara.
20	*Bambusa arundinacea*	Bonguveduru.
21	*Bassia latifolia*	Ippa.
22	*Bauhinia purpurea*	Peddari.
23	*Bauhinia racemosa*	Ari.
24	*Bauhinia vahlii*	Madapputiga.
25	*Bombax malabaricum*	Buruga.
26	*Borassus flabelliformis*	Thadi.
27	*Boswellia glabra*	Anduga.
28	*Bridelia montana*	Ponthangi.
29	*Bridelia retusa*	Koramanu.
30	*Buchanania lanzan*	Sara.
31	*Butea frondosa*	Moduga.
32	*Cæsalpinia crista*	Gachatiga.
33	*Calotropis gigantea*	Jilledu.
34	*Capparis grandis*	Nalluppi.
35	*Careya arborea*	Dudippa.
36	*Carissa carandas*	Kalivi.
37	*Carissa spinarium*	Vaka, Kalivi.
38	*Casearia temonetosa*	Girugudu.
39	*Cassia auriculata*	Tangedu.
40	*Cassia fistula*	Rela.
41	*Cassia siamea*	Simatangedu.
42	*Chloroxylon swietenia*	Billudu.
43	*Chomelia asiatica*	Kommi.
44	*Cissus quadrangularis*	Nalleru.
45	*Cleistanthus collinus*	Vodisa, Kodisa.
46	*Cocculus laurifolius*	Dusaritiga.
47	*Cochlospermum gossypium*	Kondagogu.
48	*Commiphora caudata*	Kondaregu.
49	*Cordia domestica*	Botuka.
50	*Dalbergia latifolia*	Jittegi.
51	*Dalbergia paniculata*	Pachari.
52	*Delonix elata*	Sunkesula.
53	*Delonix regia*	Erraturayi.
54	*Dendrocalamus strictus*	Sannaveduru.
55	*Derris scandens*	Nallatiga.
56	*Dichrostachys cinerea*	Veluturu.
57	*Diospyros chloroxylon*	Ulinda.
58	*Diospyros melanoxylon*	Tumiki.
59	*Dodonaea viscosa*	Bandhari.
60	*Dolichandrone crispa*	Niruddi.
61	*Dolichandrone falcata*	Oddi.
62	*Elaeodendron glaucum*	Neridi.
63	*Erythrina suberosa*	Mullumoduga.
64	*Erythroxylon monogynum*	Devadaru.
65	*Euphorbia antiquorum*	Bonthajamudu.
66	*Euphoribia nivulia*	Akujamudu.
67	*Euphorbia tirucalli*	Jamudu.
68	*Euphorbia tortilis*	Tirugujamudu.
69	*Feronia elephantum*	Velaga.
70	*Ficus bengalensis*	Marri.
71	*Ficus glomerata*	Athi.
72	*Ficus hispida*	Boddamarri.
73	*Ficus religiosa*	Ragi.
74	*Ficus retusa*	Juvvi.
75	*Ficus tomentosa*	Kaljuvvi.
76	*Flacourtia ramontchi*	Kanregu.
77	*Fluggea leucopyrus*	Tellapurugudu.
78	*Gardenia gummifera*	Manchibikki.
79	*Gardenia latifolia*	Peddabikki.
80	*Gardenia lucida*	Yerribikki.
81	*Garuga pinnata*	Garuga.
82	*Givotia rottleriformis*	Tellapoliki.
83	*Gmelina arborea*	Gummadi.
84	*Grewia damine*	Chittijana.
85	*Grewia rothii*	Jana.
86	*Grewia tiliaefolia*	Pedda jana.
87	*Gymnosporia montana*	Danthi.
88	*Gyrocarpus americanus*	Kumarapoliki.
89	*Hardwickia binata*	Yepi.
90	*Helicteres isora*	Gubathada.
91	*Hemidesmus indicus*	Sugandipala.
92	*Hibiscus platanifolius*	Adavipathi.
93	*Holarrhena antidysenterica*	Palabariki.
94	*Holoptelea integrifolia*	Tapasi.
95	*Hymenodictyon excelsum*	Dudippa.
96	*Indigofera pulchella*	Kondavempali.
97	*Ixora parviflora*	Gorivi.
98	*Jasminum auriculatum*	Malle.
99	*Lagestroemia parviflora*	Chennangi.
100	*Lawsonia inermis*	Gorinta.
101	*Limonia acidissima*	Thorrivelaga.
102	*Maba buxifolia*	Uti.
103	*Mangifera indica*	Mamidi.
104	*Melia composita*	Turakavepa.
105	*Memecylon edule*	Alli.
106	*Mimosa rubicaulis*	Undrakampa.
107	*Mimusops hexandra*	Pala.
108	*Moringa concanensis*	Adavimunaga.
109	*Mucuna prurita*	Deluganda.
110	*Mundulea suberosa*	Verribiludu.
111	*Murraya konigii*	Karuvepaku.
112	*Mitragyna parvifolia*	Battaganapu.
113	*Ochna squarrosa*	Kukkamovi.
114	*Ocimum sanctum*	Krishnathulasi.
115	*Odina wodier*	Gumpini.
116	*Opuntia dillenii*	Nagajamudu.
117	*Pavetta indica*	Papidi.
118	*Phoenix humilis*	Chittita.
119	*Phoenix sylvestris*	Ita.
120	*Phyllanthus emblica*	Usirikai.
121	*Phyllanthus polyphyllus*	Gnnangi.
122	*Plectronia didyma*	Nallabalasu.
123	*Plectronia parviflora*	Balasu.
124	*Polyalthia cerasoides*	Chilkadudduga.
125	*Pongamia glabra*	Kanuga.
126	*Premna tementosa*	Navuru.
127	*Prosopis spicigera*	Jammi.
128	*Pterocarpus marsupium*	Yegi.
129	*Pterocarpus santalinus*	Yerrasandanam.
130	*Pterolobium indicum*	Pariki.

Serial number.	Botanical name.	Telugu name.
131	*Pterospermum suberifolium*	Thada.
132	*Randia dumetorum*	Manga.
133	*Randia uliginosa*	Adavimanga.
134	*Salvadora persica*	Varagogu.
135	*Sansevieria roxburghiana*	Saganara.
136	*Sapindus emarginatus*	Kunkudu.
137	*Santalum album*	Srigandam.
138	*Sarcostemma brevistigma*	Dustappatiga.
139	*Schrebera swietenioides*	Mokkam.
140	*Semecarpus anacardium*	Jidi.
141	*Sesbania aegyptiaca*	Sominthal.
142	*Solanum pubescens*	Ustikaya.
143	*Soymida febrifuga*	Somi.
144	*Sterculia urens*	Yerrapoliki.
145	*Strychnos nux-vomica*	Mushti.
146	*Strychnos potatorum*	Chilla.
147	*Syzygium jambolanum*	Neredu.
148	*Tamarindus indica*	Chinta.
149	*Tectona grandis*	Teku.
150	*Tephrosia purpurea*	Vempali.
151	*Terminalia arjuna*	Tellamaddi.
152	*Terminalia belerica*	Thandra.
153	*Terminalia chebula.*	Karaka.
154	*Terminalia tomentosa*	Nallamaddi.
155	*Tinospora cordifolia*	Tippatiga.
156	*Vitex altissima*	Nemali adugu.
157	*Vitex lecucoxylon*	Lokki.
158	*Vitex negundo*	Vayala.
159	*Wrightia tinctoria*	Reppala.
160	*Zizyphus jujuba*	Regu.
161	*Zizyphus œnoplia*	Pariki.
162	*Zizyphus xylopyrus*	Gotti.

Serial number.	Telugu name.	Botanical name.
1	Adavimanga	*Randia uliginosa.*
2	Adavimunuga	*Moringa concanensis.*
3	Adavinimma	*Atalantia monophylla.*
4	Adavipathi	*Hibiscus platanifolius.*
5	Addasaram	*Adhatoda vasica.*
6	Akujamudu	*Euphorbia nivulia.*
7	Alli	*Memeeylon edule.*
8	Anduga	*Boswellia glabra.*
9	Ari	*Bauhinia racemosa.*
10	Athi	*Ficus glomerata.*
11	Balasu	*Plectronia parviflora*
12	Bandhari	*Dodonaea viscosa.*
13	Battaganapu	*Mitragyna parvifolia.*
14	Billudu	*Chloroxylon swietenia.*
15	Boddamarri	*Ficus hispida.*
16	Bonguveduru	*Bambusa arundinacea.*
17	Bonthajamudu	*Euphorbia antiquorum.*
18	Botuka	*Cordia domestica.*
19	Burrajala	*Acacia latronum.*
20	Buruga	*Bombax malabaricum.*
21	Chennangi	*Lagertræmia parviflora.*
22	Chikreni	*Albizzia amara.*
23	Chilakadudduga	*Polyalthia cerasoides.*
24	Chilla	*Strychnos potatorum.*
25	Chinduga	*Albizzia odoratissima.*
26	Chinta	*Tamarindus indica.*
27	Chirumanu	*Anogeissus latifolia.*
28	Chittijana	*Grewia domine.*
29	Chittita	*Phoenix humilis.*
30	Danthi	*Gymnosporia montana.*
31	Deluganda	*Mucuna prurita.*
32	Devadaru	*Erythroxylon monogynum.*
33	Dirisinam	*Albizzia lebbek.*
34	Dudippa	*Careya arborea.* *Hymenodictyon excelsum.*
35	Dusaritiga	*Cocculus laurifolius.*
36	Dustappatiga	*Sarcostemna brevistigma.*
37	Erraturai	*Delonix regia.*
38	Gachatiga	*Cæsalpinia crista.*
39	Gara	*Balanites rox-burghii.*
40	Garuga	*Garuga pinnata.*
41	Girugudu	*Casearia tomentosa.*
42	Gorinta	*Lawsonia inermis.*
43	Gorivi	*Ixora parviflora.*
44	Gotti	*Zizyphus xylopyrus.*
45	Gubakorinda	*Acacia pennata.*
46	Gubathada	*Helicteres isora.*
47	Gummadi	*Gmelina arborea.*
48	Gumpini	*Odina wodier.*
49	Guninangi	*Phyllanthus polyphyllus.*
50	Guruginja	*Abrus precatorius.*
51	Ippa	*Bassia latifolia.*
52	Ita	*Phoenix sylvestris.*
53	Jammi	*Prosopis spicigera.*
54	Jamudu	*Euphorbia tirucalli.*
55	Jana	*Grewia rothii.*
56	Jidi	*Semecarpus anacardium.*
57	Jilledu	*Caltropis gigantea.*
58	Jittegi	*Dalbergia latifolia.*
59	Juvvi	*Ficus retusa.*
60	Kalivi	*Carissa carandas.*
61	Kaljuvvi	*Ficus tomentosa.*
62	Kanregu	*Flacourtia ramontchi.*
63	Kanuga	*Pongamia glabra.*
64	Karaka	*Terminalia chebula.*
65	Karuvepaku	*Murraya konigii.*
66	Kommi	*Chomelia asiatica.*
67	Kondagogu	*Cochlospermum gossypium.*
68	Kondaregu	*Commiphora caudata.*
69	Kondavempali	*Indigofera pulchella.*
70	Koramanu	*Bridelia retusa.*
71	Korinda	*Acacia cassia* (*Acacia intsia*).
72	Krishnathulasi	*Ocimum sanctum.*
73	Kukkamovi	*Ochna squarrosa.*
74	Kumarapoliki	*Gyrocarpus americanus.*
75	Kunkudu	*Sapindus emarginatus.*
76	Lokki	*Vitex leucoxylon.*
77	Madapputiga	*Bauhinia vahlii.*
78	Maddi	*Morinda citrifolia.*
79	Malle	*Jasminum auriculatum.*
80	Mamidi	*Mangifera indica.*
81	Manchibikki	*Gardenia gummifera.*
82	Manga	*Randia dumetorum.*
83	Maredu	*Aegle marmelos.*
84	Marri	*Ficus bangalensis.*
85	Moduga	*Butea frondosa.*
86	Mokkam	*Schrebera swietenioides.*
87	Mullumoduga	*Erythrina suberosa.*
88	Mushti	*Strychnos nux-vomica.*
89	Nagajamudu	*Opuntia dillenii.*
90	Nallabalasu	*Plectronia didyma.*
91	Nallatiga	*Derris scandens.*
92	Nallatumma	*Acacia arabica.*
93	Nalleru	*Cissus quandrangularis.*
94	Nalluppi	*Capparis grandis.*
95	Navuru	*Premna tomentosa.*
96	Nemaliadugu	*Vitex altissima.*
97	Neredu	*Syzyium jambolanum.*
98	Neridi	*Elaeodendron glaucum.*
99	Niruddi	*Dolichandrone crispa.*
100	Oddi	*Dolichandrone falcata.*
101	Pachari	*Dalbergia paniculata.*
102	Pala	*Mimusops hexandra.*
103	Palabariki	*Holarrhena antidysenterica.*
104	Papidi	*Pavetta indica.*
105	Pariki	*Pterolobium indicum.* *Zizyphus œnoplia.*
106	Peddabikki	*Gardenia latifolia.*
107	Peddajana	*Grewia tiliaefolia.*

Serial number.	Telugu name.	Botanical name.
108	Peddamanu	*Ailanthus excelsa.*
109	Peddari	*Bauhinia purpurea.*
110	Ponthangi	*Bridelia montana.*
111	Ragi	*Ficus religiosa.*
112	Regu	*Zizyphus jujuba.*
113	Rela	*Cassia fistula.*
114	Reppala	*Wrightia tinctoria.*
115	Rudraganapa	*Adina cordifolia.*
116	Saganara	*Sansevieria roxburghiana.*
117	Sannaveduru	*Dendrocalamus strictus.*
118	Sara	*Buchanania lanzan.*
119	Simatangedu	*Cassia siamea.*
120	Somi	*Soymida febrifuga.*
121	Somintha	*Sesbania aegyptiaca.*
122	Srigandam	*Santalum album.*
123	Sugandhipala	*Hemidesmus indicus.*
124	Sundra	*Acacia sundra.*
125	Sunkesula	*Delonix elata.*
126	Tangedu	*Cassia auriculata.*
127	Tapasi	*Holoptelea integrifolia.*
128	Teku	*Tectona grandis.*
129	Tellamaddi	*Terminalia arjuna.*
130	Tellapoliki	*Givotia rottleriformis.*
131	Tellapurugudu	*Fluggea leucopyrus.*
132	Tellatumma	*Acacia leucophloea.*
133	Thada	*Pterospermum suberifolium.*
134	Thadi	*Borassus flabelliformis.*
135	Thandra	*Terminalia belerica.*
136	Thorrivelaga	*Limonia acidissma.*
137	Tippatiga	*Tinospora cordifolia.*
138	Tirugujamudu	*Euphorbia tortilis.*
139	Tumiki	*Diospyros melanoxylon.*
140	Turakavepa	*Melia composita.*
141	Udaga	*Alangium salvifolium.*
142	Ulinda	*Diospyros chloroxylon.*
143	Undrakampa	*Mimosa rubicaulis.*
144	Usirikai	*Phyllanthus emblica.*
145	Ustikai	*Solanum pubescens.*
146	Uti	*Maba buxifolia.*
147	Vaka	*Carissa spinarium.*
148	Varagogu	*Salvadora persica.*
149	Vayala	*Vitex negundo.*
150	Velaga	*Feronia elephantum.*
151	Veluthuru	*Dichrostachys cinerea.*
152	Vempali	*Tephrosia purpurea.*
153	Vepa	*Azadirachta indica.*
154	Verribilludu	*Mandulea suberosa.*
155	Vodisa	*Cleistanthus collinus.*
156	Yegi	*Pterocarpus marsupium.*
157	Yepi	*Hardwickia binata.*
158	Yerrapoliki	*Sterculia urens.*
159	Yerrasandanam	*Pterocarpus santalinus.*
160	Yerribikki	*Gardenia lucida.*

APPENDIX II.

MAPS.

The following is a list of maps (Survey of India sheets 4 inches = 1 mile) relating to the division :—

Stock maps—	
Dornal Range	Nallamalai sheets 32, 33, 34, 38, 39, 40, 43, 44 and 45.
Gundlakamma Range	Nallamalai sheets 10, 13, 18, 22 and 27.
Giddalur Range	Nallamalai sheets 3, 4, 5, 6, 7 and 10. Veligonda sheets 1, 2, 3, 4, 5, 6, 7 and 8.
Ganjivaripalli Range	Nallamalai sheets 42, 43, 44, 54, 55, 56, 61, 62, 64 and 65
Turimella Range	Nallamalai sheets 10, 11, 12, 13, 18, 19, 21, 22, 27, 28, 33 and 34. Somidevipalli sheets 1 and 2.
Markapur Range	Nallamalai sheets 20, 21, 28, 29, 30, 31, 32, 33 and 40.
Total sheets	61
Detailed maps—	
Dornal Range	Nallamalai sheets 33, 34, 38 and 39.
Gundlakamma Range	Nallamalai sheets 10, 13, 18 and 22.
Giddalur Range	Nallamalai sheets 5, 6, 7 and 10. Veligonda sheets 1, 2, 3, 4, 7 and 8.
Ganjivaripalli Range	Nallamalai sheets 43, 44, 54, 55, 61, 62 and 65.
Turimella Range	Nallamalai sheets 10, 11, 12, 13, 22, 24, 27 and 28. Somidevipalli sheets 1 and 2.

In addition to the above detailed maps have been prepared on tracing paper for the Rotational Burning Scheme and the *Sterculia urens* blocks for gum.

2. The stock maps show the vegetational types, the location of the pentas, the felling series and coupe boundaries for the Bamboo Working Circle, the roads, bridle paths, foot-paths, fire lines, forest buildings, water sources, etc., in the division. The detailed maps show the distribution of the felling series, division into coupes and coupes felled in the past in the Timber, Pole, Softwood, Small Timber and Fuel Working Circles.

3. Four sets of stock maps and four sets of detailed maps were prepared and distributed as follows :—

One set of stock and detailed maps	Office copy.
Do.	For the use of the District Forest Officer.
Do.	For the use of the Range Officers.
Do.	For the use of the Territorial Conservator.

4. A key map on a scale of 1 inch = 2 miles showing the disposition of the working circles, roads, buildings, cattle pens, ranges, etc., in the division has been prepared. This map will be printed with the working plan.

5. Separate tracings on paper have been made showing the location of the blocks and division into compartments for tapping *Sterculia urens* trees for gum and for the Rotational Burning Scheme on the Guttalachenu plateau in Ganjivaripalli Range. A separate tracing has been made showing the area for the manufacture of charcoal under the miscellaneous prescriptions.

Proceedings of the Chief Conservator of Forests

Proceedings No. 102, Press, 18th March 1942

Working Plan—Kurnool East Division—Sanctioned.

W. G. Dyson, Esq., I.F.S.,
Chief Conservator of Forests.

Proceedings—No. 102, Press, dated 18th March 1942.

Sanctioned, with the remark that the prescriptions for the Manure Leaf Working Circle are approved only tentatively pending the orders of Government on the general question of localized manure leaf cutting, which has been referred to them.

W. G. Dyson,
Chief Conservator of Forests.

To the Conservator of Forests, Bellary Circle, Bellary.
,, District Forest Officer, Kurnool East Division, Kurnool.
,, Collector of Kurnool district, Kurnool.

Copy to other Conservators of Forests.
,, the President, Forest Research Institute, Dehra Dun.
,, the Provincial Silviculturist, Ootacamund.

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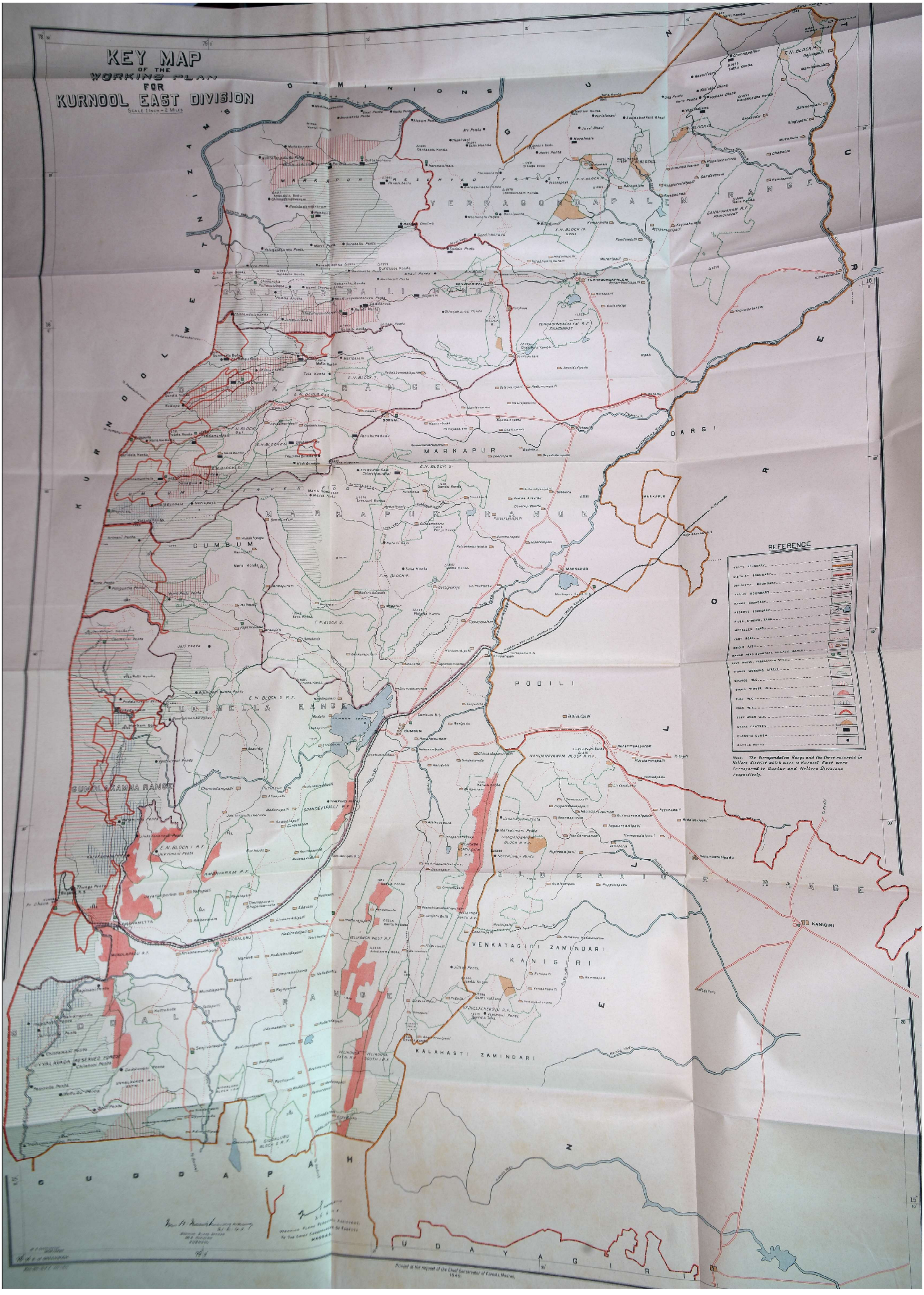
KEY MAP
OF THE
WORKING PLAN
FOR
KURNOOL EAST DIVISION
SCALE 1 INCH = 2 MILES
NIZAM'S DOMINIONS
KURNOOL WEST
GUNTUR
NELLORE
CUDDAPAH
UDAYAGIRI
DARSI
MARKAPUR
PODILI
CUMBUM
KANIGIRI
KALAHASTI ZAMINDARI
VENKATAGIRI ZAMINDARI
MARKAPUR RESERVED FOREST
YERRAGONDAPALEM RANGE
GANJIVARIPALLI RANGE
DORNALA RANGE
CUMBUM RESERVED FOREST
MARKAPUR RANGE
URIMELLA RANGE
GUNDLAKAMMA RANGE
ALLUR RANGE
OLD KANIGIRI RANGE
REFERENCE
STATE BOUNDARY
DISTRICT BOUNDARY
DIVISIONAL BOUNDARY
TALUK BOUNDARY
RANGE BOUNDARY
RESERVE BOUNDARY
RIVER, STREAM, TANK
METALLED ROAD
CART ROAD
BRIDLE PATH
RANGE HEAD QUARTERS, VILLAGE, HAMLET
REST HOUSE, INSPECTION SHED
TIMBER WORKING CIRCLE
BAMBOO W.C.
SMALL TIMBER W.C.
FUEL W.C.
POLE W.C.
SOFT WOOD W.C.
GRASS CENTRES
CHENCHU GUDEM
CATTLE PENTA
Note. The Yerragondalem Range and the three reserves in Nellore district which were in Kurnool East were transferred to Guntur and Nellore Divisions respectively.
Printed at the request of the Chief Conservator of Forests, Madras,
1940.

613. *Chenchu goats.*—Under the concessions admitted in favour of the Chenchus at the time of Forest Settlement, they are permitted to keep and graze a certain number of goats subject to a maximum prescribed for each gudem. Some of the gudems which existed at the time of settlement have been abandoned by the Chenchus and new ones have sprung up. Migration of individual Chenchus from one gudem to another has taken place. Whether the Chenchu goat right forms an adjunct of the gudem or is attached to the individual Chenchus has been a matter of some doubt. A perusal of the Section 16 Notifications reveals the following facts :—

(a) The goat right is admitted for the gudem *as a whole.*

(b) The right is admitted only in favour of the Chenchus by birth or marriage.

(c) The right is exercisable within the limits of the gudem enclosure, the boundaries of which are described, though somewhat vaguely, in the notifications.

(d) The right is neither transferable nor is it exclusive or monopoly.

(e) The exercise of the right is subject to regulation by such rules as may be made from time to time by His Excellency the Governor of Fort St. George in Council.

After a careful examination of the subject the following conclusions have been arrived at by the author in regard to Chenchu goat rights :—

(a) In respect of gudems recognized at settlement and which continue to exist now in the same place the goat right cannot be extinguished or modified except to the extent it may be necessary to safeguard the interests of the servient estate. This can be done only by an order of His Excellency the Governor in Council.

(b) In respect of abandoned gudems the goat right gets extinguished automatically but will revive if the Chenchus revert to the admitted gudems.

(c) Individual migrations do not carry with them the goat quota as the settlement award is for the gudem as a whole.

(d) The migration of an entire gudem, if recognized at the new place *permanently*, will have with it the goat right; but if the migration is recognized only *temporarily*, the goat right also *may* be recognized.

Therefore, the following prescriptions are made :—

The number of goats kept in the Nallamalais by the Chenchus shall not be allowed to increase over that admitted at the time of settlement. A census should be taken now of the number of goats in Kurnool West, Kurnool East and Yerragondapalem Range (now in Guntur division) and the balance remaining after deducting the number now in Kurnool West from the total admitted number should be equitably distributed among the Chenchu gudems in Kurnool East and Yerragondapalem Range of Guntur division. Allocation to each gudem will be made on the basis of the existing population and the capacity of the forests adjoining the gudem to bear browsing. Every genuine migration of the Chenchu from one gudem to another will carry with it the goat quota. Allocations made in respect of each gudem will be revised periodically and brought up to date. This arrangement is made temporarily, in the same way as Chenchu occupations are temporarily recognized, in the best interests of the Chenchu community as a whole and will not constitute a right in respect of the new gudems; if, however, at a future date the rights of the old gudems are insisted on by the Chenchus, a contingency which is not likely to arise, the Forest Department may annul the existing arrangements and revive the old quota in respect of the admitted gudems.

614. *Chenchu rights to minor forest produce.*—One of the standing grievances of the Chenchus is that they are deprived of the right of collecting and *selling* the minor forest products in the open market owing to the intervention of the Forest department. The history of the minor forest produce given in Chapter V of Part I will show that all methods of departmental collection and the giving of liberal concessions to the Chenchus proved a failure and the present method is the only practicable method of managing the exploitation of minor forest produce till it is replaced by the co-operative system which the Collector has in view, whereby the profits made by the intermediate agency, at present the contractor, will be distributed among the Chenchus themselves, who will be members of the society. The Chenchus are generally indebted to the Komatis in the plains and any direct contact between the Chenchus and the Komatis should be discouraged. The necessity to employ only Chenchu labour, in localities where they exist, for the collection of the minor forest produce and to pay the Chenchus in kind rather than in coin in the presence of the local staff is emphasized as a measure of ensuring correct payments by the contractors for collections made by the Chenchus.